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A revision of Afrotropical species of *Stylogaster* Macquart (Diptera: Conopidae), with descriptions of twenty-one new species and an identification key

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ABSTRACT

A taxonomic revision of the Afrotropical species of *Stylogaster* Macquart is presented and 21 new species are described: *S. acanthocercus* sp. n., *S. amplicercus* sp. n., *S. clementsi* sp. n. (all Madagascar), *S. copelandi* sp. n. (Kenya), *S. fanjae* sp. n., *S. hauseri* sp. n., *S. hirsutifemora* sp. n., *S. irwini* sp. n. (all Madagascar), *S. kakamegensis* sp. n., *S. kenyensis* sp. n. (both Kenya), *S. kirkspriggsi* sp. n. (South Africa), *S. kroeberi* sp. n., *S. latifrons* sp. n., *S. parkeri* sp. n., *S. pseudofanjae* sp. n., *S. ranomafanensis* sp. n., *S. rinhaii* sp. n., *S. schachti* sp. n., *S. smithi* sp. n., *S. spinicercus* sp. n., and *S. stuckenbergi* sp. n. (all Madagascar). A lectotype is designated for *S. seyrigi* Séguy, 1932 and a neotype for *S. frontalis* Kröber, 1914. The male terminalia of *S. frontalis* Kröber, 1914, *S. pauliana* Camras, 1962, *S. malgachensis* Camras, 1962, *S. seguyi* Camras, 1962 and *S. seyrigi* Séguy, 1932 are illustrated for the first time. New faunistic records are presented for nine previously described species of *Stylogaster*. An identification key to Afrotropical *Stylogaster* is presented. A total of 34 valid species of the genus are now known from the Afrotropical Region.

KEY WORDS: Diptera, Conopidae, *Stylogaster*, Afrotropical Region, Madagascar, identification key, lectotype, neotype, new species, thick-headed flies.

INTRODUCTION

The genus *Stylogaster* Macquart, 1835 is a remarkable group of Conopidae Latreille, 1802 with an unusual morphology and biology. *Stylogaster* occurs mainly in the Neotropical and Afrotropical regions. Two valid species are known from the Nearctic Region (Curran 1942), 70 from the Neotropical Region (Camras & Parrillio 1985, 1996; Camras 1989, 1992, 2003; Rocha & de Mello-Patiu 2009), nine from the Oriental and Australasian regions (Smith 1979; Stuke 2006) and 15 from the Afrotropical Region (Smith 1967, 1984).

The larval biology differs markedly from that of other Conopidae and is still poorly understood. The imagines are often associated with columns of army ants (Hymenoptera: Dorylinae) (Bequaert 1922, 1930; Cohic 1948; Camras 1962*a*; Stuckenberg 1963; Kronauer 2008) and females dart their highly modified eggs (Fig. 90) into calyptrate Diptera that accompany army ant columns (Stuckenberg 1963; Smith 1967, 1969; Smith & Cunningham-van Someren 1985; Kotrba 1997; Couri & Pont 2006; Couri & Barros 2010). However, it is believed that these Calyptratae are not the normal larval hosts, as usually no larva can be found internally.

Van den Berghe *et al*. (1956) mentioned *S. leonum* Westwood, 1851 as being an accidental parasite of *Glossina morsitans* Westwood, 1851 (Diptera: Glossinidae), but the source of this information remains unclear. The only reliable records of larvae from the Afrotropical Region are from crickets (Orthoptera) and from cockroach (Blattodea) nymphs (Smith & Cunningham-van Someren 1985). Woodley and Judd (1988) report that the Nearctic *Stylogaster biannulata* Say, 1823 was reared from *Gryllus rubens* Scudder, 1902 (Orthoptera: Gryllidae) in Florida.

Imagines of *Stylogaster* spp. share some remarkable morphological characters which distinguish them from the remaining Conopidae, and these are especially conspicuous

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in the terminalia and the chaetotaxy. For these reasons, *Stylogaster* was treated by Rohdendorf (1964) in a family of its own, the Stylogasteridae Williston, 1885. Gibson *et al.* (2010) established that Stylogasterinae, comprising the single genus *Stylogaster*, is monophyletic and is at the basal split of the Conopidae *s.l.*, but whether it is really necessary to separate the genus as a separate family as proposed by Rohdendorf remains questionable and must await the outcome of further phylogenetic studies.

During the past few years, numerous *Stylogaster* specimens from the Afrotropical Region have been amassed, including several new species and some additional records of described species of *Stylogaster*. The details are presented in this paper.

MATERIAL AND METHODS

Terminology used in this paper follows Cumming and Wood (2009), although the interpretation of the male terminalia differs, especially the taxonomically important paired structure of the hypandrium lateral to the phallus. This structure is termed the "postgonite" by Skevington *et al*. (2010) or "palpi genital" by Lopes (1971). This anteriorly-directed prolongation of the hypandrium, which surrounds the basal phallus laterally, is here termed the "phallus sheath". Sinclair (*in litt*.) pointed out that this structure is different from the "phallus guide" as defined by Cumming and Wood (2009). The true postgonite of *Stylogaster* is less conspicuous, having been overlooked in several descriptions of *Stylogaster* terminalia, and is situated between the phallus sheath and the junction of the epandrium and hypandrium. Another conspicuous structure in some species is an anteriorly-directed hemispherical extension of the hypandrium, which surrounds the phallus ventrally (Figs 1, 2, 4). An overview of the main structures of the male terminalia is provided in Figs 1–10. The arista is usually 3-segmented, but in some specimens, only 2 segments are evident. The base of the arista can be invaginated in dried specimens, so that the basal segment is not visible. The number of setae is given in pairs and the number of damaged setae in absolute numbers. For example, "2 notopleural setae (3 damaged)", means that there are two pairs of notopleural setae—which can be seen from the sockets left behind—but that only 1 seta is retained on the specimen. The overall body length is measured from the apex of the abdomen to the frons (excluding antenna). The height of the head is the maximum distance from the upper margin of the eye to the ventral margin of the head. The following abbreviations are used for wing cells: *bc* – basal costal cell; *bm* – basal medial cell; *br* – basal radial cell; *c* – costal cell; cua_1, *cup*, – cubital cells; *dm* – discal medial cell; r_1, r_{2+3}, r_{4+5} – radial cells; *sc* – subcostal cell.

All material from Madagascar was originally preserved in alcohol and was dried subsequently. Thus, the specimens are bleached to some extent. For type specimens, label information is cited *verbatim*, a line break being indicated by a division slash (/). The identification of the species is summarised in the key below.

International codens used in the text:

AMGS – Albany Museum, Grahamstown, South Africa;
BMNH – The Natural History Museum, London, UK;
CAS – Californian Academy of Sciences, San Francisco, USA;
DC – Private collection of D. Clements;
FMNH – Field Museum of Natural History, Chicago, USA;

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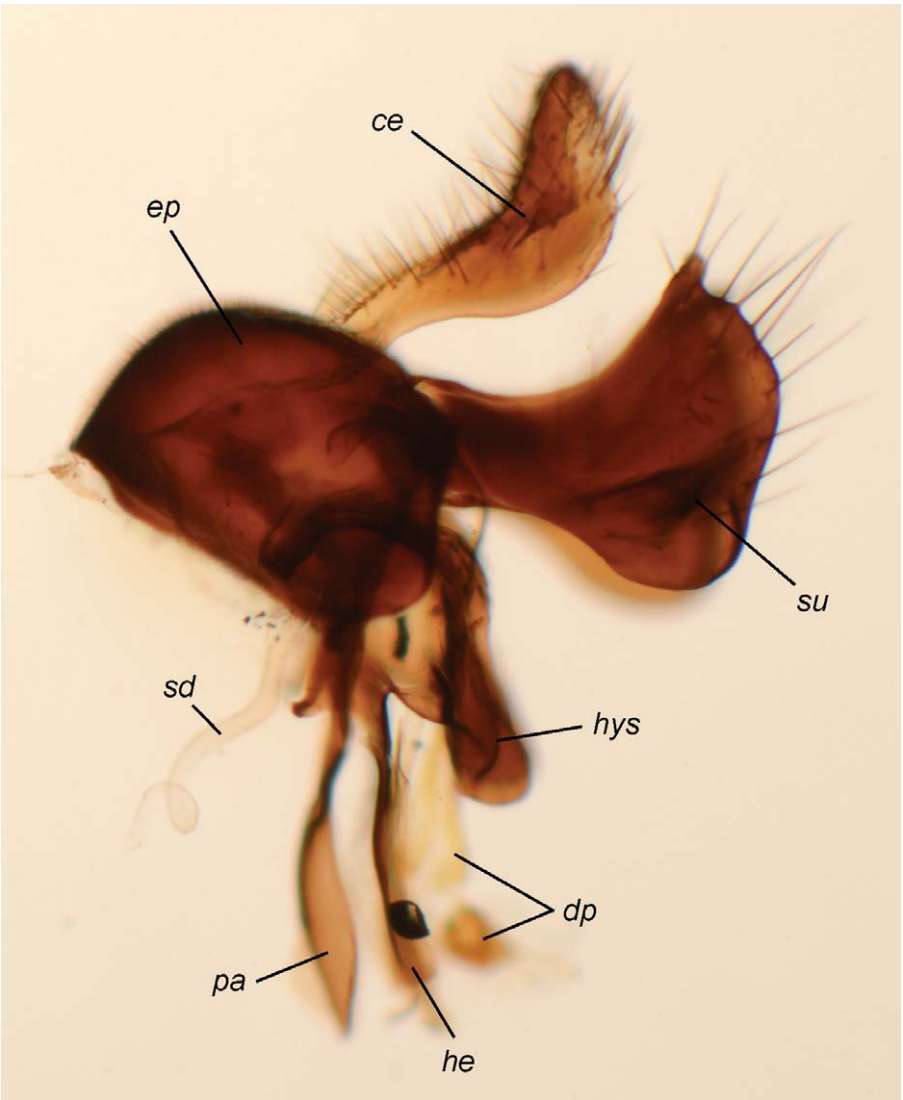


Fig. 1. Male terminalia of *Stylogaster copelandi* sp. n., lateral view (holotype). Abbreviations: *ce* – cercus; *dp* – distiphallus; *ep* – epandrium; *he* – hemispherical extension of hypandrium; *hys* – phallus sheath of hypandrium; *pa* – phallus apodeme; *sd* – sperm duct; *su* – surstylus. Not to scale.

J-HS – Private collection of J.-H. Stuke;
MB – Private collection of M. Bartak;
MNHN – Muséum national d'Histoire naturelle, Paris, France;
NHMB – Naturhistorisches Museum, Basel, Switzerland;
NMKE – National Museum of Kenya, Nairobi, Kenya;
NMSA – KwaZulu-Natal Museum, Pietermaritzburg, South Africa;
MRAC – Musée Royal de l'Afrique Centrale, Tervuren, Belgium;
ZMHB – Museum für Naturkunde der Humboldt-Universität, Berlin, Germany.

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Annotated key to Afrotropical species of *Stylogaster* Macquart

1 Basal flagellum pointed, with apical arista (Fig. 54) 2
– Basal flagellum rounded, with dorsal arista (Fig. 15) 3

2 Occiput with conspicuous band of white setulae; terminalia of ♂ as in Figs 195–199, phallus sheath of hypandrium concave apically, without strong setae basally (Fig. 197) (endemic to Madagascar) ..... **pauliana** Camras, 1962
– Occiput with only a few black setulae, no band evident; terminalia of ♂ as in Figs 1, 56–59, phallus sheath of hypandrium convex apically, with strong setae basally (Fig. 58) (only known from Kenya) ..... **copelandi** sp. n.

3 Basal flagellomere very large, *ca* 6× as long as pedicellus (Fig. 80); ♂ terminalia as in Figs 82–88; female terminalia as in Fig. 89; eggs as in Fig. 90 ..... **hauseri** sp. n.
– Basal flagellomere smaller, less than 3× as long as pedicellus; other characters different 4

4 Ocellar triangle pointed anteriorly (Fig. 140), shiny part not reaching base of antennae; thorax and abdomen without black or dark brown markings (Figs 136, 138); tergite 1 with long white setulae laterally, tergite 2 with row of strong long black setae laterally; cell r_{4+5} conspicuously widened medially (Fig. 137); ♂ hind trochanter with dense black setulae (Fig. 142); hind tibia entirely clothed in white setulae distally (Fig. 143); surstylus conspicuously long (Figs 144, 145) (only known from South Africa) 5
– Ocellar triangle usually parallel-sided, stout anteriorly, usually reaching base of antennae (*e.g.*, Figs 95, 156, 184); thorax and abdomen in many species with black or dark brown markings; tergites 1 and 2 with some other combination of setae and setulae; cell r_{4+5} less conspicuously or not widened medially (*e.g.*, Figs 17, 185); ♂ hind trochanter usually without dense black setulae; hind tibia with black or white setulae distally, restricted to one side; surstylus different; widely distributed species 6

5 ♂ mid tibia with conspicuous tuft of long, dense white setulae apically (Fig. 141); base of surstylus with a few scattered black setulae, shorter than width of cercus (Figs 144, 145) ..... **kirkspriggsi** sp. n.
– ♂ mid tibia without tuft of long, dense white setulae apically; base of surstylus with tuft of dense black setulae about as long as width of cercus (Smith 1967: 58, fig. 43) ..... **complexa** (Bigot, 1859)
[Females of *Stylogaster kirkspriggsi* sp. n. are unknown and therefore only males of *S. kirkspriggsi* sp. n. and *S. complexa* sp. n. can be separated at this time.]

6 Hind tibia white distally, clearly contrasting with blackish base and with short white setulae posteriorly (*e.g.*, Fig. 227); proepisternal setae golden brown; mesoscutum orange-brown or brown, not blackish 7
– Hind tibia not white distally, not contrasting with blackish base, or if white distally, then without short white setulae posteriorly (*e.g.*, Figs 41, 277); proepisternal setae golden brown or black; mesoscutum blackish in several species 12

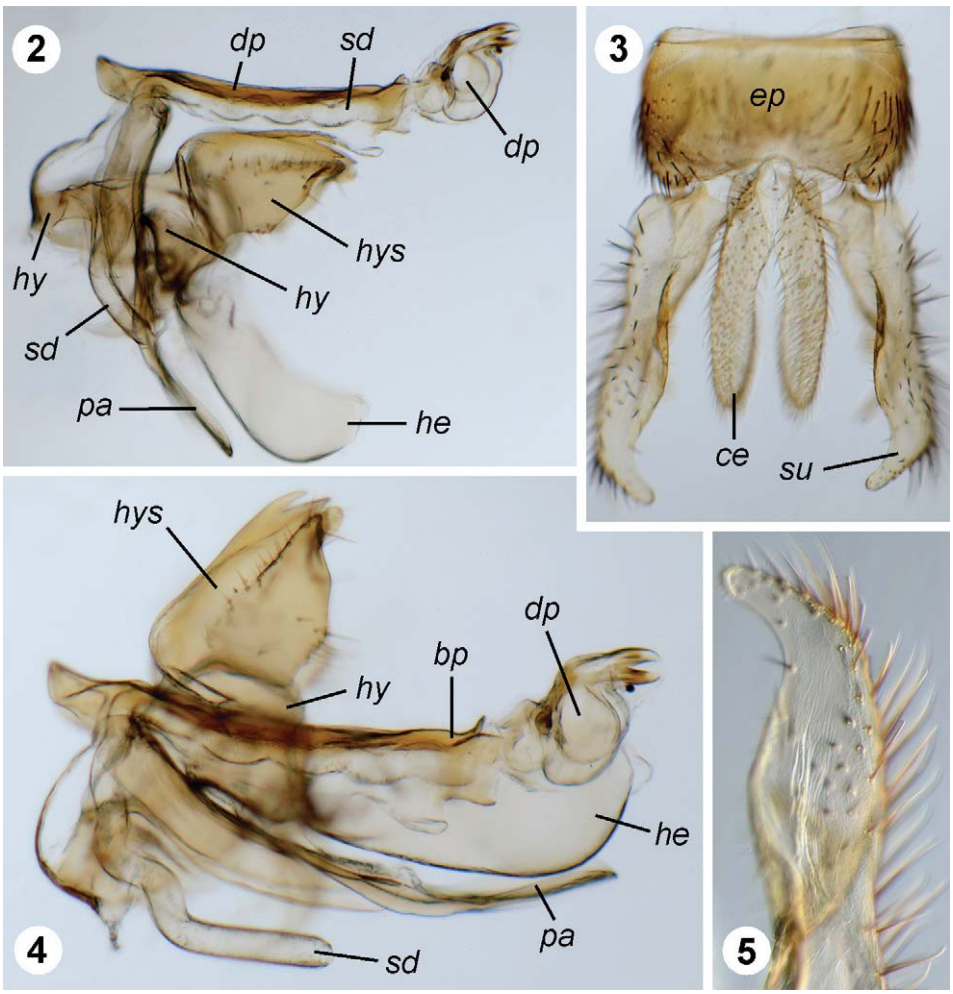
7 Tergites orange-brown, lacking black markings (*e.g.*, Fig. 287) 8
– At least some tergites with darker posterior margins (*e.g.*, Figs 153, 164, 274) 10

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8 Ocellar triangle black, remainder of frons orange-brown; ♂ terminalia as in Figs 2–10; ♀ terminalia shorter than body length, apex as figured by Smith (1967: 63, fig. 57); egg as figured by Smith (1967: 51, fig. 8) (widely distributed in Africa, not recorded from Madagascar) ..... **westwoodi** Smith, 1967

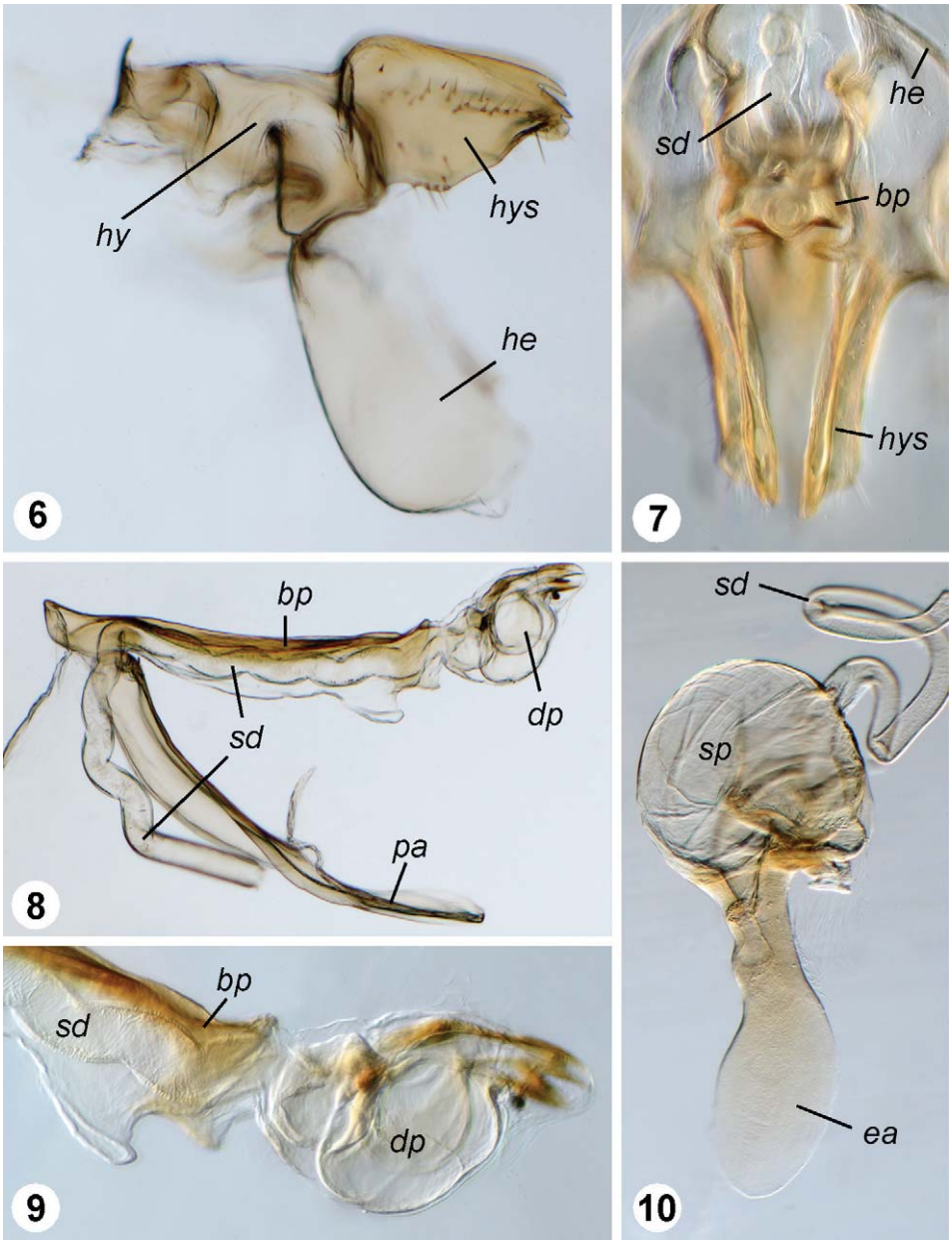
– Frons entirely black (Fig. 289); ♂ terminalia different; ♀ terminalia longer than remaining body length (Smith 1967) (endemic to Madagascar).....9

9 Anepisternum, katepisternum and meron with distinct black maculae; ♂ terminalia as in Figs 255–259 ..... **seyrigi** Séguy, 1932



Figs 2–5. Male terminalia of *Stylogaster westwoodi* Smith (Kenya, "Wika"): (2) hypandrium and aedeagus, pulled apart, lateral view; (3) epandrium with surstyli, dorsal view; (4) hypandrium and aedeagus, not pulled apart, lateral view; (5) tip of surstylus, dorsal view. Abbreviations: *bp* – basiphallus; *ce* – cercus; *dp* – distiphallus; *ep* – epandrium; *he* – hemispherical extension of hypandrium; *hy* – hypandrium; *hys* – phallus sheath of hypandrium; *pa* – phallus apodeme; *sd* – sperm duct; *su* – surstylus. Not to scale.

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Figs 6–10. Terminalia (♂) of *Stylogaster westwoodi* Smith (Kenya, "Wika"): (6) hypandrium, lateral view; (7) hypandrium and aedeagus, dorsal view; (8) aedeagus, lateral view; (9) tip of aedeagus, lateral view; (10) sperm pump and ejaculatory apodem. Abbreviations: *bp* – basiphallus; *ce* – cercus; *dp* – distiphallus; *ea* – ejaculatory apodem; *he* – hemispherical extension of hypandrium; *hy* – hypandrium; *hys* – phallus sheath of hypandrium; *pa* – phallus apodeme; *sd* – sperm duct; *sp* – sperm pump. Not to scale.

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– Pleura uniformly yellow-brown; ♂ terminalia as in Figs 290–296 .... **stuckenbergi** sp. n.

[Females of at least two species key out here. One may represent *S. stuckenbergi* sp. n., whilst the other belongs to an as yet undescribed species. In our current stage of knowledge, it is not clear which of the available female specimens belongs to *S. stuckenbergi* sp. n.]

10 Frons black lateral to ocellar triangle (Fig. 228), ♂ terminalia as in Figs 229–235 .....**rinhaii** sp. n.

– Frons orange-brown lateral to the ocellar triangle (Fig. 156) 11

11 Ocelli not greatly enlarged medially (Fig. 181); ♂ terminalia as in Figs 157–162 . .....**kroeberi** sp. n.

– Ocelli greatly enlarged medially (Fig. 180); ♂ terminalia as in Figs 173–179 ....**malgachensis** Camras, 1962

[The following species can be separated mainly on the structure of the male terminalia. It is not possible to assign females to males. *S. cohici* Séguy, 1946 (Ivory Coast) and *S. bigoti* Smith, 1967 (Nigeria), are known from female type material only and cannot currently be identified. As the holotype of *S. nilssoni* Smith, 1984 is female, it is uncertain whether the male paratype is conspecific.]

12 Male terminalia as figured by Smith (1967: 57, fig. 37), surstylus broad, with thin but long appendix shorter than epandrium, some black setae on inner surface and some long setulae apically ..... **leonum** Westwood, 1851

– Male terminalia as figured by Smith (1967: 65, fig. 76), surstylus broad, with unique, thin but long appendix subequal to length of epandrium, no black setae on inner surface and several long setulae apically .....**obscurinotum** Kröber, 1936

– Male terminalia not as above 13

13 Mid femur with row of regular, long black setulae posteroventrally, but without long erect ventral setulae longer than tibial diameter; doubtful species have conspicuous laterally widened cercus.....14

– Mid femur with row of regular, long black setulae posteroventrally and long, erect ventral setulae longer than diameter of basal hind tibia (*e.g.*, Figs 41, 213, 239) 27

14 Species not occurring in Madagascar.....15

– Species confined to Madagascar 18

15 Mesoscutum orange-brown; mid femur with short, dense, erect black setulae ventrally; cell r_{4+5} distinctly broader than cell r_{2+3}; ♂ terminalia as figured by Smith (1967: 57, fig. 34), two diagnostically thick black setae on inner surface of surstylus .....**varifrons** Malloch, 1930

– Mesoscutum black; mid femur without conspicuous black strong setulae ventrally; cell r_{4+5} about as broad as cell r_{2+3}; ♂ terminalia different, without two thick black setae on inner surface of surstylus 16

16 Pedicellus conspicuously longer than basal flagellomere (Fig. 126); mesoscutum orange-brown at lateral margin (Fig. 125); terminalia as in Figs 129–135, phallus sheath without conspicuous setae .....**kenyensis** sp. n.

– Pedicellus shorter than basal flagellomere or subequal (Fig. 116); mesoscutum black or brown at lateral margin (Fig. 115); terminalia different, phallus sheath with conspicuous setae.....17

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17 ♂ terminalia as figured by Stuckenberg (1963: 270, figs. 10, 13, as *parva*) and Smith (1967: 57, fig. 40), surstylus without a distinct strong black tooth on anterior margin ..... **nitens** Brunetti, 1925
– ♂ terminalia as in Figs 119–124, surstylus with distinct strong black tooth on anterior margin (Figs 119, 120) ..... **kakamegensis** sp. n.

18 Mesoscutum, except postpronotum, entirely black (*e.g.*, Fig. 200); tergites 5–6 mainly brown to black (*e.g.*, Fig. 201); frons black lateral to ocellar triangle (*e.g.*, Fig. 204) 19
– Mesoscutum more or less orange-brown (*e.g.*, Figs 104, 163); tergites 5–6 and epandrium mainly orange-brown to yellow (*e.g.*, Figs 107, 164); frons usually not black lateral to ocellar triangle (*e.g.*, Fig. 106) 21

19 Mid tibia with dense black setulae on ventral surface (Fig. 65); ♂ terminalia as in Figs 66–71, distal margin of surstylus with 2 black teeth (Fig. 68), no black setae at base of phallus sheath (Fig. 69), surstylus as in Fig. 68..... **fanjae** sp. n.
– Mid tibia without dense black setulae on ventral surface; ♂ terminalia different, at least overall shape of surstylus different 20

20 Terminalia as figured by Stuckenberg (1963: 270, figs 9, 11, 12, 14) and Smith (1967: 57, fig. 41) and in Figs 36, 37; phallus sheath of hypandrium with black setae basally; surstylus without black teeth at distal margin..... ..... **camrasi** Stuckenberg, 1963
– Terminalia as in Figs 205–210: phallus sheath of hypandrium without black setae basally; surstylus with 2 black teeth at distal margin..... **pseudofanjae** sp. n.

21 Terminalia as figured by Smith (1984: 234, fig. 7), distal margin of surstylus with 2 black teeth and long dense setulae between, shape of surstylus most similar to surstylus of *S. amplicercus* (Fig. 30), but cercus without conspicuous lateral lappet ..... **nilssoni** Smith, 1984
– Terminalia not as above 22

22 Frons broad, distance of vertical seta to lateral ocellus longer than distance between lateral ocelli (Fig. 166); occiput with only 3 long white setulae ventrally, mouth opening with 5 or 6 short black setulae; ♂ terminalia as in Figs 168–172: cercus with diagnostic long setulae distally (Fig. 171) ..... **latifrons** sp. n.
– Frons narrow, distance of vertical seta to lateral ocellus shorter than distance between lateral ocelli; occiput with several white setulae ventrally; mouth opening with long white setulae 23

23 Cercus with conspicuous lateral lappet and black spines (Figs 33, 282) 24
– Cercus without lateral lappet and black spines 25

24 Terminalia as in Figs 279–284: surstylus with strong, conspicuous long black setae distally (Fig. 279) ..... **spinicercus** sp. n.
– Terminalia as in Figs 30–35: surstylus without conspicuous strong long setae (Fig. 30)..... **amplicercus** sp. n.

25 Ocellar tubercle without ocellar setae; terminalia as in Figs 109–114, cercus with long setae ventrally (Fig. 112), surstylus with a slightly sclerotised long tooth (Figs 109, 110), phallus sheath with conspicuous black colouration at apex (Fig. 113)... ..... **irwini** sp. n.

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– Ocellar tubercle with ocellar setae; terminalia different 26

26 Terminalia as in Figs 186–194, with conspicuous strong black setulae on inner surface of surstylus (Fig. 188)..... **parkeri** sp. n.
– Terminalia as in Figs 248–254, no conspicuous strong black setulae on inner surface of surstylus ..... **seguyi** Camras, 1962

27 Species widely distributed in Africa, but not recorded from Madagascar; terminalia as in Figs 72–76 ..... **frontalis** Kröber, 1914
– Species endemic to Madagascar 28

28 Base of hind femur with conspicuous long setulae distinctly longer than diameter of base of hind femur (Fig. 94) 29
– Base of hind femur without long setulae distinctly longer than diameter of base of hind femur 30

29 Frons orange-yellow lateral to ocellar triangle (Fig. 95); terminalia as in Figs 97–103, unique shape of surstylus as in Figs 97, 98, cercus with 2 pairs of black blunt spines and long spines (Figs 100, 101) ..... **hirsutifemora** sp. n.
– Frons black lateral to ocellar triangle (Fig. 16); terminalia as in Figs 18–24, shape of surstylus as in Fig. 18, cercus with long black tooth and with 3 or 4 black spines (Fig. 21)..... **acanthocercus** sp. n.

30 Mesoscutum orange-brown, as is abdomen (Figs 38, 211)..... 31
– Mesoscutum blackish brown, like dark markings on abdomen (Fig. 236) 32

31 Terminalia as in Figs 217–222, cercus with conspicuous black margin on dorsal inner surface and with long tooth bearing two short black spines (Figs 219, 220) ..... **ranomafanensis** sp. n.
– Terminalia as in Figs 44–50, cercus without conspicuous black margin on dorsal inner surface, but with isolated black setulae, and without tooth bearing black spines (Fig. 48) ..... **clementsi** sp. n.

32 Basal flagellomere distinctly longer than scapus and pedicellus combined (Fig. 238); terminalia as in Figs 242–247 ..... **schachti** sp. n.
– Basal flagellomere not significantly longer than scapus and pedicellus combined (Fig. 264); terminalia as in Figs 267–272..... **smithi** sp. n.

TAXONOMY

Genus *Stylogaster* Macquart, 1835

Refer to Appendix for synonymy.

Stylogaster acanthocercus sp. n.

Figs 11–24

Etymology: From latinized Greek *akantha* (thorn) and *kerkos* (tail), referring to the diagnostic spines on the cercus.

Diagnosis: The occurrence and arrangement of spines on the cercus (Fig. 21) is unique and distinguishes *S. ancanthocercus* sp. n. from all other Afrotropical *Stylogaster* species.

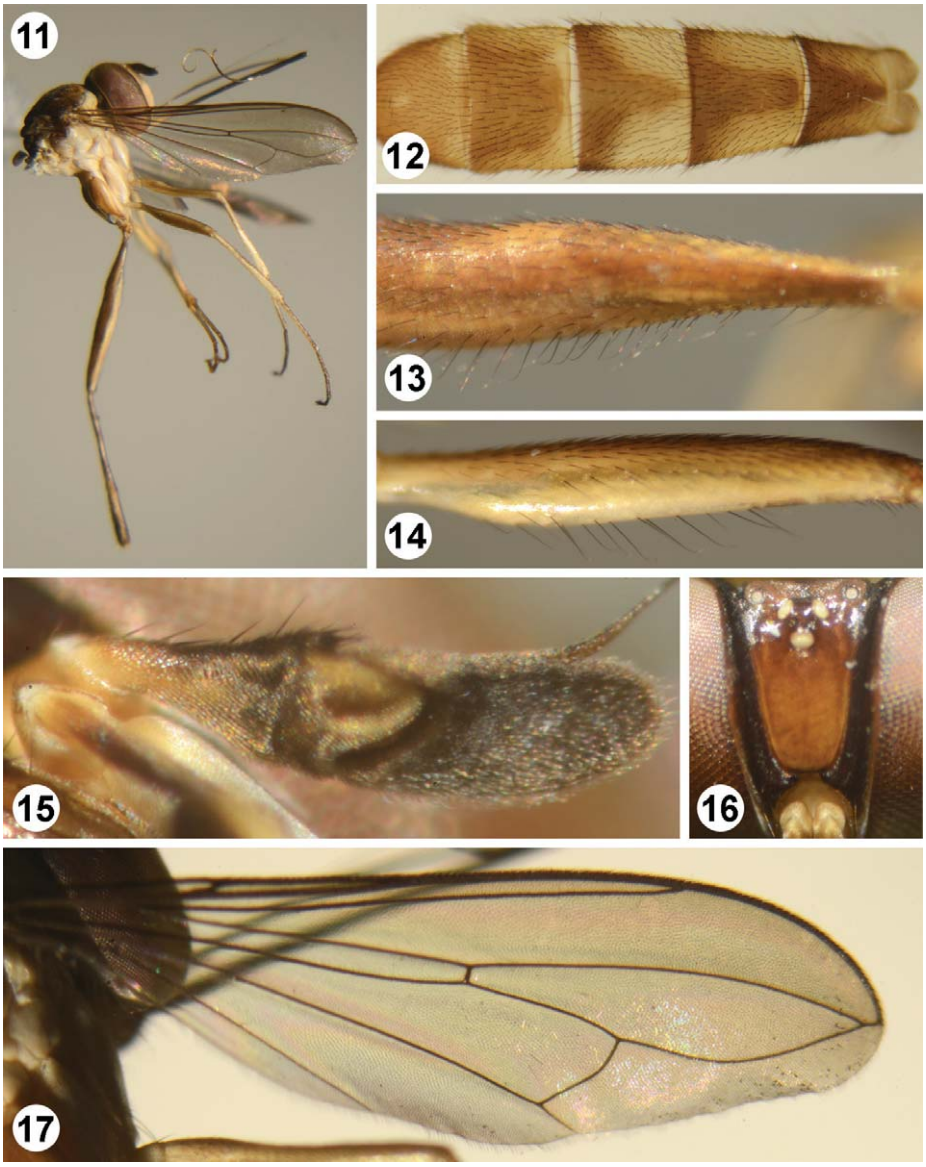
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Description (based on holotype):

Male.

Overall length: *ca* 6.3 mm.

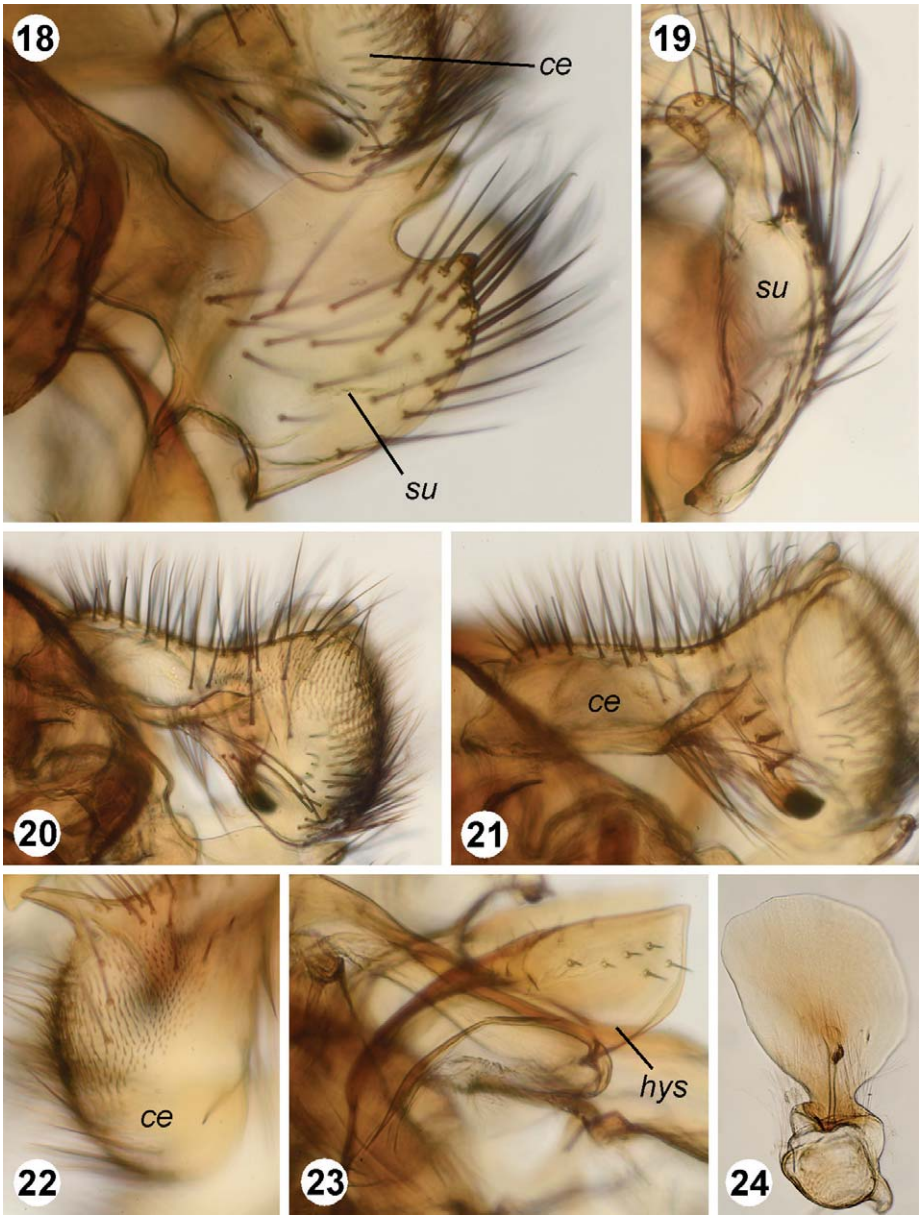
Head: 1.5 mm high. Eye brown, with a few scattered inconspicuous ommatrichia. Facets on inner side of eye slightly enlarged. Ocelli pale brown. Ocellar tubercle blackish



Figs 11–17. *Stylogaster acanthocercus* sp. n. (♂ holotype): (11) habitus, lateral view; (12) abdomen, dorsal view; (13) base of hind femur; (14) mid femur; (15) antenna, lateral view; (16) frons; (17) wing. Not to scale.

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brown, with 1 pair ocellar setae (1 damaged). Ocellar triangle occupying almost entire frons, reaching as far as antennae (Fig. 16). Ocellar triangle brown. Frons black lateral to ocellar triangle, with 1 or 2 fronto-orbital setae distinguishable. Scapus and base of



Figs 18–24. Terminalia (♂) of *Stylogaster acanthocercus* sp. n. (paratype): (18) surstylus, lateral view; (19) same, ventral view; (20) cercus, lateral view; (21) same, lateral view, focused on ventral conjunction; (22) apex of cercus, ventrolateral view; (23) phallus sheath of hypandrium, lateral view; (24) sperm pump and ejaculatory apodeme. Abbreviations: *ce* – cercus; *hys* – phallus sheath of hypandrium; *su* – surstylus. Not to scale.

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pedicellus yellow-orange, basal flagellomere and pedicellus apex blackish brown. Arista blackish brown, 2 segments evident. Arista situated dorsally at apex of basal flagellomere (Fig. 15). Scapus with a few black setulae dorsally. Pedicellus with black setulae. Shape of antenna as illustrated (Fig. 15). One vertical seta (both damaged). Face pale yellow with silver pruinosity. Occiput black, distinctly silver pruinose; with line of regularly-arranged small white setulae dorsally, and with several longer white setulae ventrally. Some long white setulae at mouth opening. Proboscis yellow-brown basally, becoming dark brown distally, except for yellow-brown distal, divided part of labellum. Labrum *ca* 3.2 mm, labellum approximately same length.

Thorax: Yellow-white; mesoscutum (with exception of postpronotum and postalar calli), scutellum, mediotergite and laterotergite blackish brown to brown. All setae damaged, with exception of 2 black notopleural setae and 2 white setae on propleuron. Scars of 2 notopleural setae evident, 1 supra-alar seta, 2 postalar setae, 1 praescutellar dorsocentral seta, 1 apical scutellar seta, 1 seta on anepimeron and 1 seta above fore coxa on propleuron. Some black setulae on the anepimeron. Black semi-adpressed setulae on mesoscutum.

Wing: Length 5.2 mm. Generally clothed in microtrichia, except for base of *br*, *bm*, base of *dm* and *cup*. Hind margin with black or brown setulae. Venation as in Fig. 17. Haltere uniformly pale yellow, knob brown, with areas of sensillae at base.

Legs: Fore and mid legs pale yellow-white. Hind leg pale brown dorsally, hind tibia white distally. Hind tarsi damaged. Legs mainly with black or brown setulae, only fore and mid tibiae with pale yellow setulae. Setae on fore coxa white, setae on mid and hind coxae black. Fore coxa without distinct setae, but with strong white setulae distally. Mid coxa with 1 black seta laterally and some black setulae anteriorly. Hind coxa with 1 short lateral black seta and also distally on anterior surface with strong black setulae. Hind trochanter without teeth or dense setulae. Mid femur with row of regularly-arranged black setulae posteriorly on basal half and black setulae ventrally that are slightly longer than diameter of mid tibia. Mid tibia with short, dense black setulae ventrally. Hind femur with long black setulae posteriorly. Hind tibia with 3 short black spines on anterior surface. Claws dark brown basally, black distally. Pulvilli pale brown. Empodia short, pale brown.

Abdomen: Pale yellow, tergite 1 mainly brown, tergites 2–3 with brown posterior margin and brown medial fascia, tergites 5–6 with wide brown medial fascia, epandrium mainly brown (Fig. 12). Tergites with semi-adpressed black setulae. Tergite 1 with long black setulae laterally, tergite 2 with 6 black lateral (and mostly damaged) setae on either side of the anterior margin. Terminalia as illustrated in Figs 18–24. Cercus rounded distally (Fig. 20). Dorsal margin concave. Cercus with long black tooth and 3 or 4 black spines (Fig. 21). Surstylus with 2 black teeth distally, no setulae on inner surface. Phallus sheath as illustrated in Fig. 23.

Female. Unknown.

Holotype: ♂ MADAGASCAR: (1) "Madagascar, Fianarantsoa Prov., / Belle Vue, 1.2 km S Ranomafana / Nat'l Park entrance, malaise / in rainforest, 21.III-12.IV.2003, / 1095 m, R Harin, M E Irwin, / 21°15.99'S. 47°25.21'E. MG 9C-57"; (2) "Holotypus / *Stylogaster* / *acanthocercus* ♂ / des. Stuke, 2011" (CAS). Left hind tarsi and right hind leg damaged, some setae and right haltere damaged, left wing torn. Abdomen dissected, macerated and deposited in glycerine in a microvial pinned beneath specimen. Holotype otherwise in reasonable condition.

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Paratypes: MADAGASCAR: *Fianarantsoa*: 1♂ Parc National Ranomafana, radio tower at forest edge, 21°15.05'S 47°24.43'E, 1130 m, 5–18.iii.2006, M. Irwin & R. Harin'Hala, Malaise trap (CAS); 1♂ same, except 13–28.iii.2005 (J-HS).

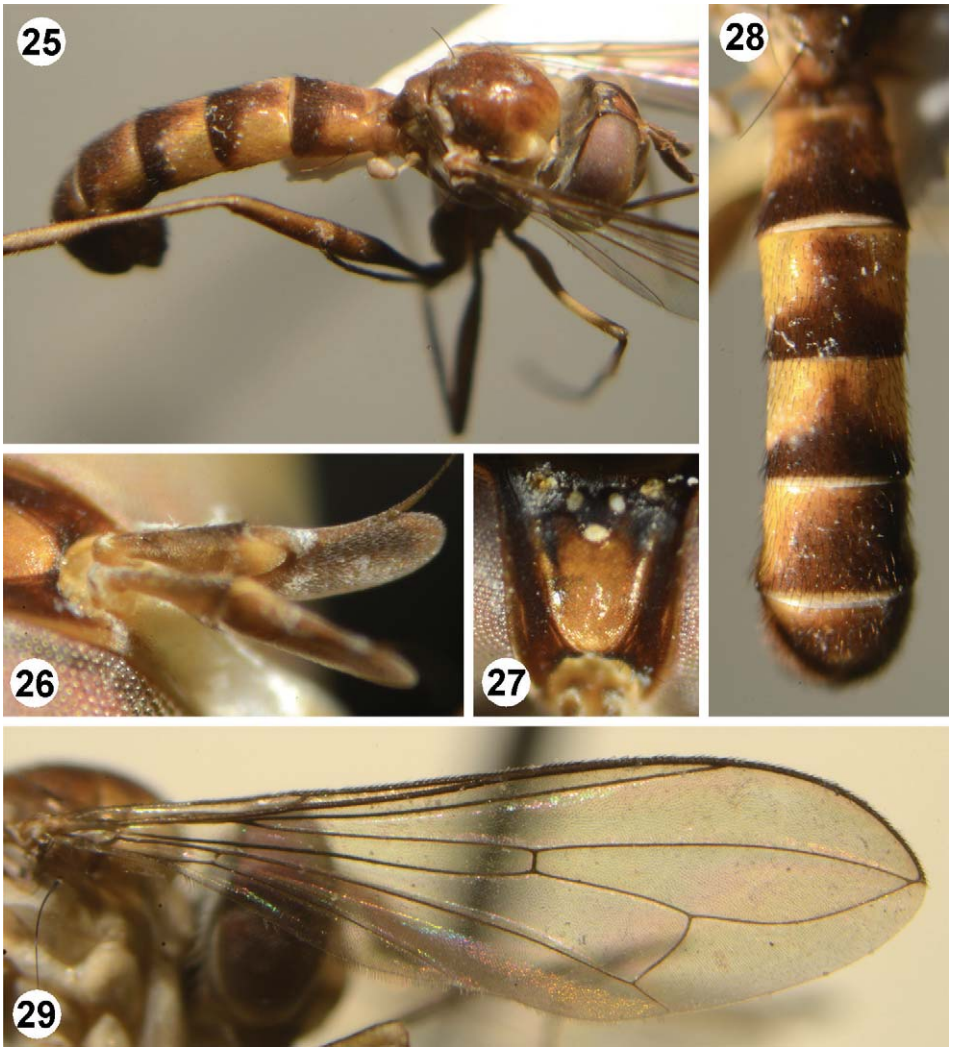
Distribution: Endemic to Madagascar.

Bionomics: Found in primary rainforest at moderately high elevation (1095–1130 m).

Stylogaster amplicercus sp. n.

Figs 25–35

Etymology: From Latin *amplus* (large) and *cercus*, reflecting the diagnostically broadened cercus of this species.



Figs 25–29. *Stylogaster amplicercus* sp. n. (♂ holotype): (25) habitus, lateral view; (26) antenna, dorsolateral view; (27) frons; (28) abdomen, dorsal view; (29) wing. Not to scale.

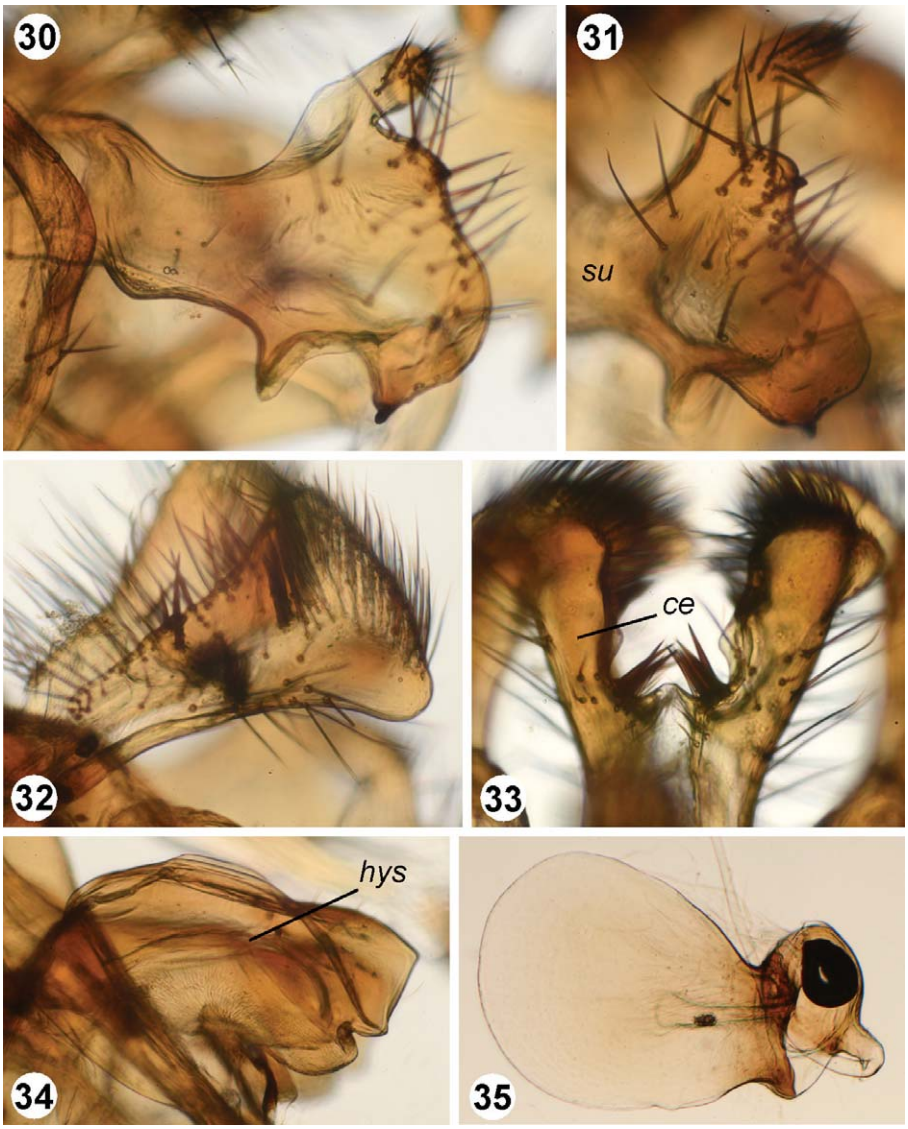
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Diagnosis: *Stylogaster amplicercus* sp. n. shares a laterally broadened cercus (Fig. 32) only with *S. spinicercus* sp. n., but is easily distinguished from it by the absence of conspicuous setae on the cercus and surstylus.

Description (based on holotype):

Male.

Overall length: *ca* 5.9 mm.



Figs 30–35. Terminalia (♂) of *Stylogaster amplicercus* sp. n. (holotype): (30) surstylus, lateral view; (31) same, dorsolateral view; (32) cercus, lateral view; (33) same, ventral view; (34) phallus sheath of hypandrium, lateral view; (35) sperm pump and ejaculatory apodeme. Abbreviations: *ce* – cercus; *hys* – phallus sheath of hypandrium; *su* – surstylus. Not to scale.

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Head: 1.4 mm high. Eye dark brown, with a few scattered, inconspicuous ommatrichia. Facets on inner side of eye slightly enlarged. Ocelli yellow-brown. Ocellar tubercle black with 1 pair of ocellar setae. Ocellar triangle occupies almost entire frons, reaching as far as antennae (Fig. 27). Ocellar triangle yellow-brown. Frons brown lateral to ocellar triangle, with 2 or 3 small fronto-orbital setae recognised. Antenna brown, pedicellus on inner surface yellow-brown distally. Arista dark brown, 3 segments evident. Arista situated dorsally at apex of basal flagellomere (Fig. 26). No conspicuous setulae dorsally on scapus. Pedicellus with black setulae. Shape of antenna as illustrated in Fig. 26. One damaged vertical seta. Face pale yellow with silver pruinosity. Occiput black to brown, distinctly silver pruinose; with line of regularly-arranged small white setulae dorsally, and with several longer white setulae ventrally. Some long white setulae on mouth opening. Proboscis pale yellow basally, becoming dark brown distally except for yellow-brown distal division of labellum. Labrum *ca* 2.5 mm, labellum approximately same length.

Thorax: Yellow-brown; mesoscutum (with exception of postpronotum), scutellum, mediotergite and dorsal part of anepisternum, orange-brown. All setae black with exception of golden seta on propleuron. Two notopleural setae (1 damaged), 1 supra-alar seta, 2 postalar setae (3 damaged), 1 praescutellar dorsocentral seta (1 damaged), 1 apical scutellar seta (1 damaged), 1 seta on anepimeron and 1 seta above fore coxa on propleuron. A few black setulae on anepimeron. Black, semi-adpressed setulae on mesoscutum.

Wing: Length 9 mm. Generally clothed in microtrichia, but base of *bc*, base of r_1, very narrowly at base of *br*, *bm* and *cup* without microtrichia. Hind edge with black or brown setulae. Venation as in Fig. 29. Haltere uniformly pale brown, with areas of sensillae at base.

Legs: Fore and mid legs pale yellow, mid tibia with pale brown area on anterior surface. Hind leg darker brown, except for hind femur having lighter medial part and yellow-brown ventral surface, and hind tibia with yellow-white subapical area. Legs mainly with black or brown setulae, only fore and mid tibiae and fore femur additionally with pale yellow setulae. Setae on fore coxa whitish yellow, those on mid and hind coxae black. Fore coxa without distinct setae, but with strong white setulae distally. Mid coxa with 1 black seta and additional strong setulae. Hind coxa with lateral black seta and additional strong black setulae distally on anterior surface. Hind trochanter with dense short black setulae. Mid femur with row of regularly-arranged black setulae posteriorly on basal half and with a few additional, longer setulae on ventral surface. Mid tibia with short erect black setulae ventrally. Hind tibia with 5 short black spines on anterior surface. Claws dark brown basally, distally black. Pulvilli pale yellow. Empodia short, brown.

Abdomen: Mainly orange-brown, tergite 1 brown, tergites 2–4 with conspicuous dark brown posterior margin and less distinct brown medial fascia, tergites 5–6 and epandrium slightly darker brown medially (Fig. 28). Tergites with semi-adpressed black setulae. Tergite 1 with long white setulae laterally, tergite 2 with 5 (mostly damaged) black lateral setae on either side of the anterior margin. Terminalia as illustrated in Figs 30–35. Cercus triangular, broadened laterally (Fig. 33). Dorsal margin slightly concave. Cercus without conspicuous lappet ventrally, but with several strong black setae on inner surface. (Fig. 33). Surstylus with 2 black teeth on distal margin. No setulae on inner surface. Phallus sheath as illustrated in Fig. 34.

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Female. Unknown.

Holotype: ♂ MADAGASCAR: (1) "MADAGASCAR / Toamasina Province / 7 km SE of Andasibe National Park / headquarters / 08.-23. April 2001 / 18°57.76'S 48°27.16'E"; (2) "California Acad. of Science / coll. M. Irwin, R. Harin'Hala / malaise trap - in tropical forest / elev 1050 m MA-01-08A-06"; (3) "Holotypus / *Stylogaster* / *amplicercus* ♂ / des. Stuke, 2011" (CAS). Right fore tarsi, hind leg and haltere damaged, right wing torn. Abdomen dissected, macerated and stored in glycerine in a microvial pinned beneath specimen, holotype otherwise in reasonable condition.

Distribution: Endemic to Madagascar.

Bionomics: Sampled in primary rainforest at moderately high elevation (1050 m).

Stylogaster camrasi Stuckenberg, 1963

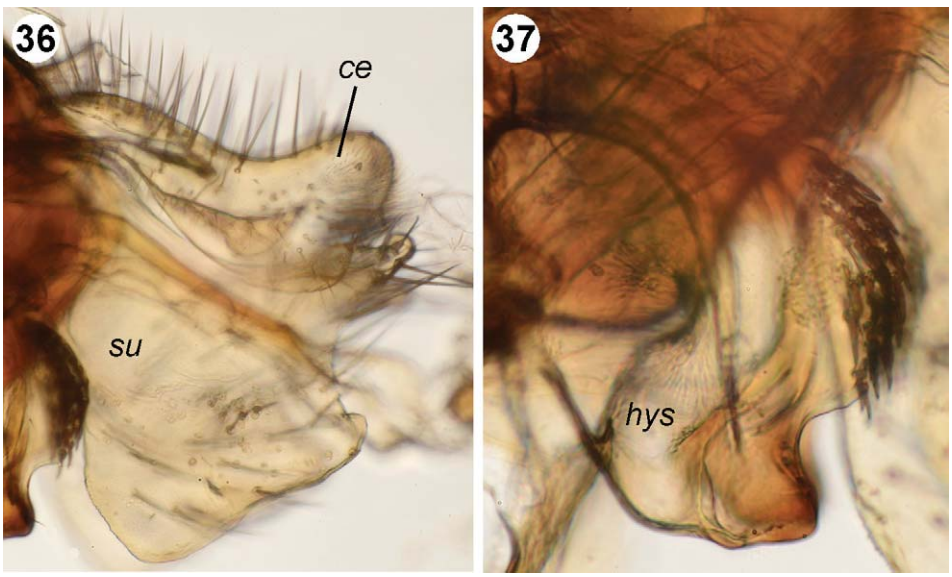
Figs 36, 37

Stylogaster camrasi Stuckenberg, 1963: 269–272 (Type locality: "Moramanga and Anosibe, east-central Madagascar, 840 m").

Literature: Smith (1967), Stuckenberg (1963).

Material examined: MADAGASCAR: *Fianarantsoa*: 1♂ Parc National Ranomafana, radio tower, at forest edge, 21°15.05'S 47°24.43'E, 1130 m, 6–17.vii.2003, M. Irwin & R. Harin'Hala, Malaise trap; 1♂ same, except 27.viii–7.ix.2003; 1♂ same, except 8–18.x.2003; 1♂ same, except 8.viii–23.ix.2004; 1♂ same, except 6–13.xi.2005; 1♂ same, except 23.vi–1.vii.2006; 2♂ Parc National Ranomafana, Belle Vue, 1.2 km S Ranomafana, entrance, rainforest, 21°15.99'S 47°25.21'E, 1095 m, 21.iii–12.iv.2003, M. Irwin & R. Harin'Hala, Malaise trap; 1♂ Parc National Ranomafana, 17 km W Ranomafana, Vohiparara, rainforest, 21°13.57'S 47°22.19'E, 1110 m, 16.x–8.xi.2001, M. Irwin & R. Harin'Hala, Malaise trap; 2♂ same, except 31.iii–8.iv.2002; 1♂ Parc National Ranomafana, 12 km W Ranomafana, entrance, radio tower, montane tropical forest, 21°15.05'S 47°24.43'E, 1215 m, 4–14.vi.2002, M. Irwin & R. Harin'Hala, Malaise trap (all CAS).

Distribution: Endemic to Madagascar.



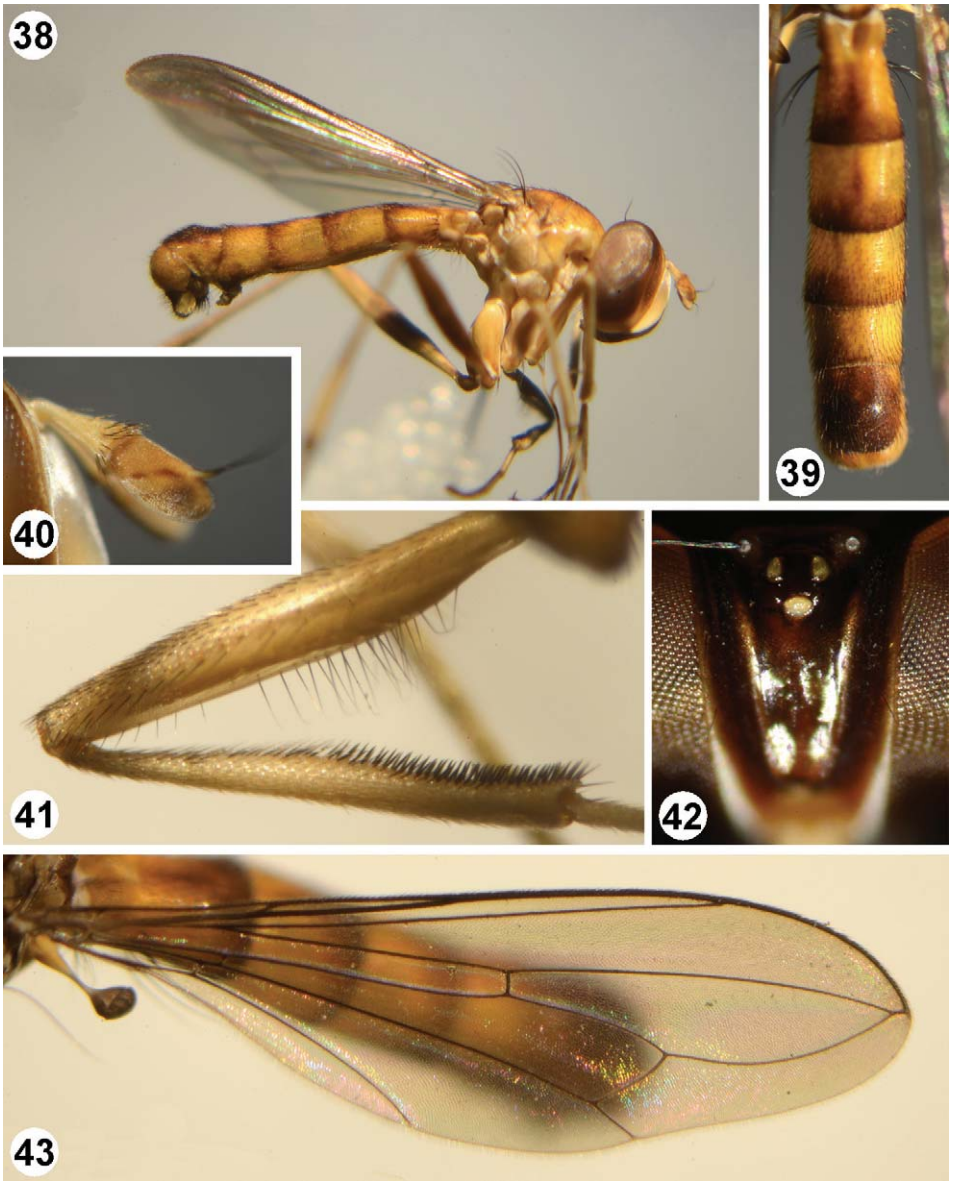
Figs 36, 37. Male terminalia of *Stylogaster camrasi* Stuckenberg (♂ Madagascar, Ranomafana): (36) surstylus and cercus, lateral view; (37) phallus sheath of hypandrium, lateral view. Abbreviations: *ce* – cercus; *hys* – phallus sheath of hypandrium; *su* – surstylus. Not to scale.

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Stylogaster clementsi sp. n.

Figs 38–50

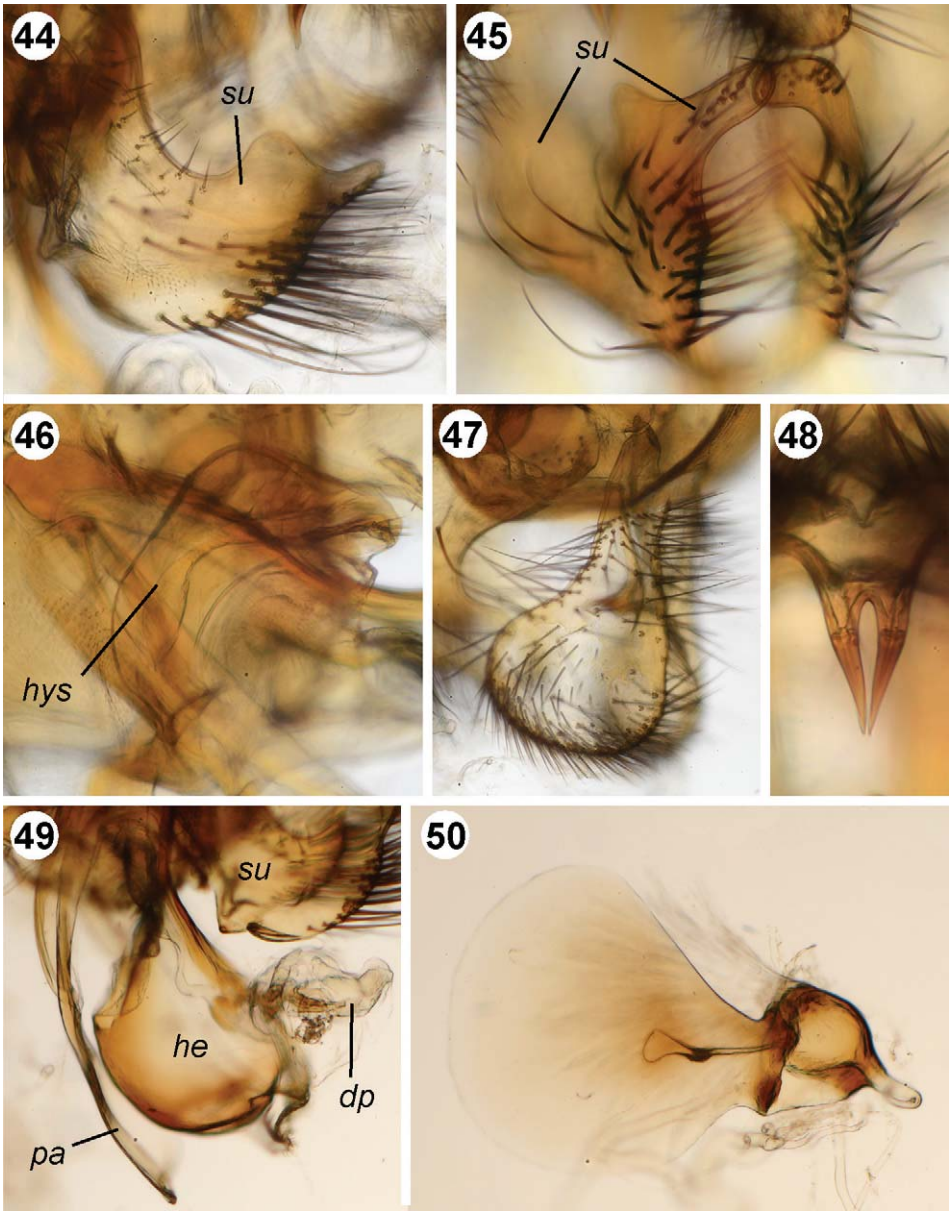
Etymology: This species is named in honour of David Clements (Cardiff), who has for many years been a significant discussion partner concerning conopids and has reliably translated German text into English.



Figs 38–43. *Stylogaster clementsi* sp. n. (♂ holotype): (38) habitus, lateral view; (39) abdomen, dorsal view; (40) antenna, lateral view; (41) mid leg; (42) frons; (43) wing. Not to scale.

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Diagnosis: *Stylogaster clementsi* sp. n. belongs to the *Stylogaster* species-group with dark markings on the abdomen and long setulae on the mid femur, but no long setulae on the hind femur. The only other species with a pale orange-brown mesoscutum belonging



Figs 44–50. Terminalia (♂) of *Stylogaster clementsi* sp. n. (paratype): (44) surstylus, lateral view; (45) same, dorsolateral view; (46) phallus sheath of hypandrium, lateral view; (47) cercus, lateral view; (48) teeth at ventral conjunction of cerci, dorsal view; (49) hemispherical extension of hypandrium; (50) sperm pump and ejaculatory apodeme. Abbreviations: *dp* – distiphallus; *he* – hemispherical extension; *hys* – phallus sheath of hypandrium; *pa* – phallus apodeme; *su* – surstylus. Not to scale.

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to this group is *S. ranomafanensis* sp. n., which is easily separable on the basis of the shape of the surstylus (Fig. 218), together with the clearly defined black margin on the dorsal inner surface of the cercus.

Description (based on holotype):

Male.

Overall length: *ca* 6.8 mm.

Head: 1.7 mm high. Eye dark brown, with a few scattered inconspicuous ommatrichia. Facets on inner side of eye slightly enlarged. Ocelli yellow-brown. Ocellar tubercle blackish brown, with 1 pair of inconspicuous ocellar setae. Ocellar triangle occupies almost entire frons and reaches as far as antennae (Fig. 42). Ocellar triangle brown. Frons blackish brown lateral to ocellar triangle with 2 proclinate fronto-orbital setae. Scapus and pedicellus yellow-brown, basal flagellomere pale brown to blackish brown. Arista dark brown, only 2 segments evident. Arista situated dorsally on basal flagellomere (Fig. 40). Scapus with a few pale brown setulae dorsally. Pedicellus with black setulae. Shape of antenna as illustrated in Fig. 40. One distinct black vertical seta. Face pale yellow, silver pruinose. Occiput black, distinctly silver pruinose; dorsally with line of regularly-arranged small white setulae, and ventrally with several longer white setulae. Some long white setulae on mouth opening. Proboscis mainly brown, except for white distal division of labellum. Labrum *ca* 3.0 mm, labellum approximately same length.

Thorax: Yellow-brown, mesoscutum (with exception of postpronotum), scutellum and mediotergite pale brown. All setae black unless otherwise stated. Two notopleural setae, 1 (damaged) supra-alar seta, 2 postalar setae, 1 praescutellar dorsocentral seta, 1 (damaged) apical scutellar seta, 1 seta on anepimeron and 1 yellow seta above fore coxa on propleuron. Black semi-adpressed setulae on mesoscutum.

Wing: Length 5.5 mm. Generally clothed in microtrichia, but *bc*, base of *c*, base of *br*, *bm*, base of *dm* and *cup* virtually without microtrichia. Hind margin of wing with brown setulae. Venation as in Fig. 43. Haltere orange-brown, distal part sharply defined dark brown with areas of sensillae at base.

Legs: Whitish yellow with brown hind femur. Legs with black and white setulae. Setae on fore and mid coxae white, setae on hind coxa black. Fore and mid coxae each with 1 long yellow seta and additionally with some shorter setulae. Hind coxa with a group of black distal setae on inner surface and 1 black seta on outer surface; additionally with scattered shorter golden setulae. Hind trochanter without teeth or conspicuous setulae. Femora with short black setulae. Mid femur posteriorly in distal half with row of regularly-arranged black setulae curved at apex. Ventral side of mid femur with black erect setulae (longer than width of tibia). Fore and mid tibiae largely clothed in white setulae. Mid tibia with conspicuous, short, dense, strong black setulae on ventral surface. Hind tibia with black setulae and conspicuous distal patch of white setulae. Hind tibia with single short black spines on anterior surface. Claws only narrowly yellow-brown basally, black distally. Pulvilli yellow or yellow-brown. Empodia short, pale brown.

Abdomen: Pale brown, with tergite 1 brown, tergites 2–4 with brown posterior margin and small brown median fascia, tergite 5 largely dark brown (Fig. 39). Tergites with semi-adpressed black setulae and longer setulae laterally on tergite 5. Tergite 1 with long black setulae laterally, tergite 2 with 5 lateral black setae on either side of anterior margin. The abdomen of the holotype has not been dissected, but matches as far as can

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be seen, the terminalia of a paratype. Terminalia as illustrated in Figs 44–50. Cercus short, rounded distally (Fig. 47). Characteristic teeth on ventral junction of cerci (Fig. 48). No black setae. Surstylus with conspicuous, dense, long black setulae at apex (Fig. 44). There are no conspicuous black spines or teeth on surstylus. Phallus sheath as illustrated in Fig. 46.

Female. Unknown.

Holotype: ♂ MADAGASCAR: (1) "Madagascar, Fianarantsoa Prov., / 12 km W Ranomafana Natl Pk / entrance. radio tower, malaise in / montane tropical forest / 4.-14.VI. / 2002, R.H.'Hala, M.E. Irwin, 1215 m / 21°15.05'S.47°24.43'E. MG 9B-31"; (2) "Holotypus / *Stylogaster* / *clementsi* ♂ / des. Stuke, 2011" (CAS). The holotype is complete and in good condition.

Paratypes: MADAGASCAR: *Fianarantsoa*: 1♂ same data as holotype, except 5–13.v.2002 (CAS); 1♂ same, except 7–18.vi.2003 (CAS); 1♂ Parc National Ranomafana, Belle Vue, 1.2 km S Ranomafana, entrance, rainforest, 21°15.99'S 47°25.21'E, 1095 m, 26–31.iii.2002, M. Irwin & R. Harin'Hala, Malaise trap (J-HS); 1♂ Parc National Ranomafana, 17 km W Ranomafana, Vohiparara, rainforest, 21°13.57'S 47°22.19'E, 1110 m, 25.vii–3.viii.2002, M. Irwin & R. Harin'Hala, Malaise trap (J-HS).

Distribution: Endemic to Madagascar.

Bionomics: Found in primary rainforest at moderately high elevation (1095–1215 m).

Stylogaster complexa (Bigot, 1859)

Ptychoproctus complexus Bigot, 1859: 109 (Type locality: South Africa: "Natal. Port [= Durban]").

Literature: Bigot (1859), Kröber (1914, 1919, 1933), von Röder (1891), Séguy (1946), Smith (1967), Stuckenberg (1963).

Material examined: SOUTH AFRICA: *KwaZulu-Natal*: 1♂ Mkuze Reserve, SE2732Cb, 300 m, 3–11.x.1977, J.G.H. Londt (NMSA).

Distribution: There is one record from Nigeria by Kröber (1933), although it remains in doubt because of the presence of several species of *Stylogaster* that were unknown at the time. Other than this, the species has been reported several times from South Africa only.

Stylogaster copelandi sp. n.

Figs 1, 51–59

Etymology: This species is named in honour of Robert Copeland (Nairobi), who has collected numerous Diptera from Kenya and has loaned material to the author.

Diagnosis: This distinctive species is easily recognised by its small, blackish brown appearance, as well as the pointed basal flagellomere and the arista situated at the apex (Figs 51, 54). The only other species with such an antenna is *S. pauliana*, a bright orange-brown endemic species of Madagascar. Additionally, the male terminalia of *S. copelandi* sp. n. are diagnostic (Figs 1, 56–59).

Description (based on holotype):

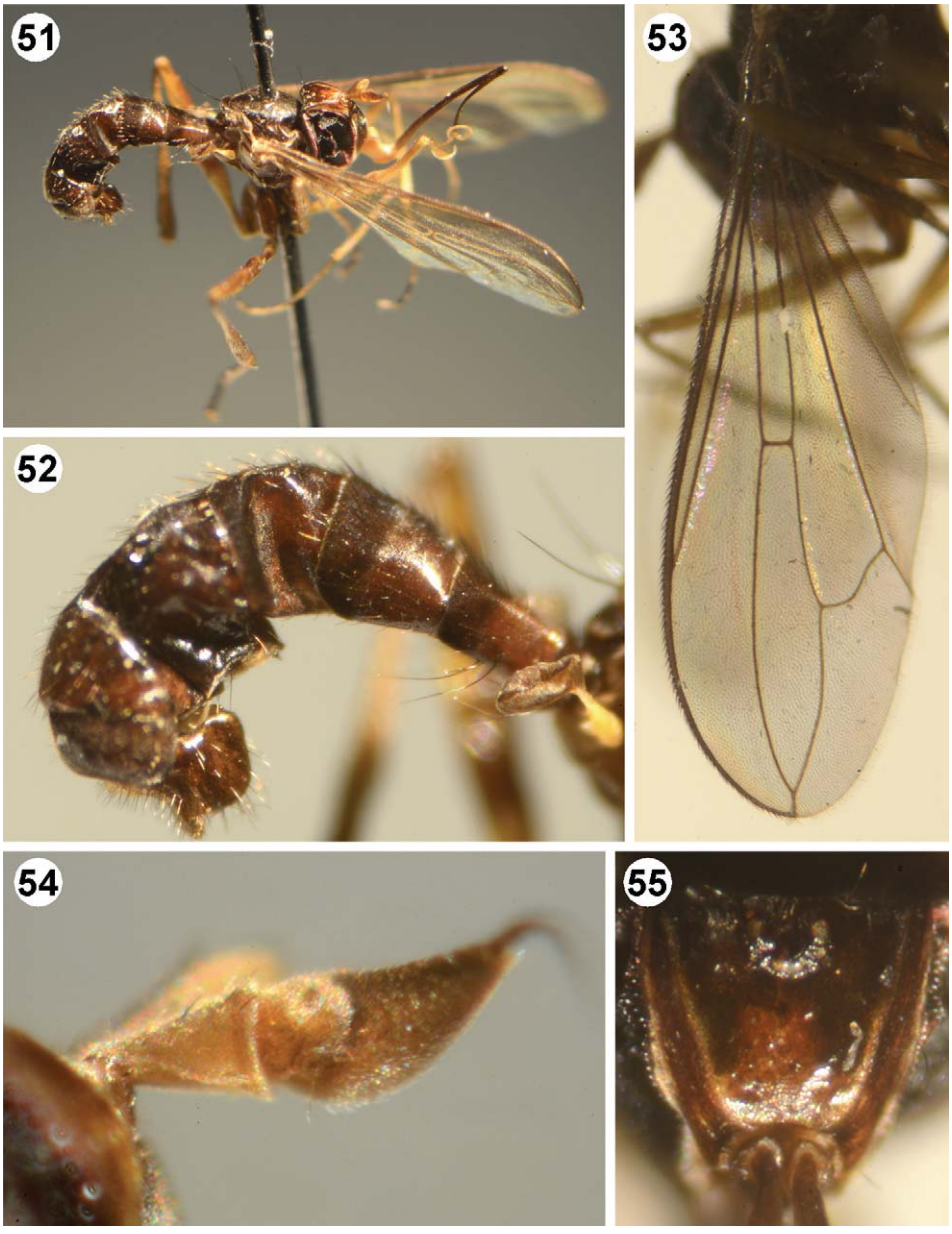
Male.

Overall length: *ca* 2.9 mm.

Head: 0.8 mm high. Eye dark brown, without ommatrichia. Facets on inner side slightly enlarged. Ocelli brown. Ocellar tubercle black, with 1 pair of inconspicuous ocellar setae. Ocellar triangle occupies virtually whole frons and reaches as far as antennae (Fig. 55). Ocellar triangle brown, apical part paler brown. Frons lateral to ocellar triangle

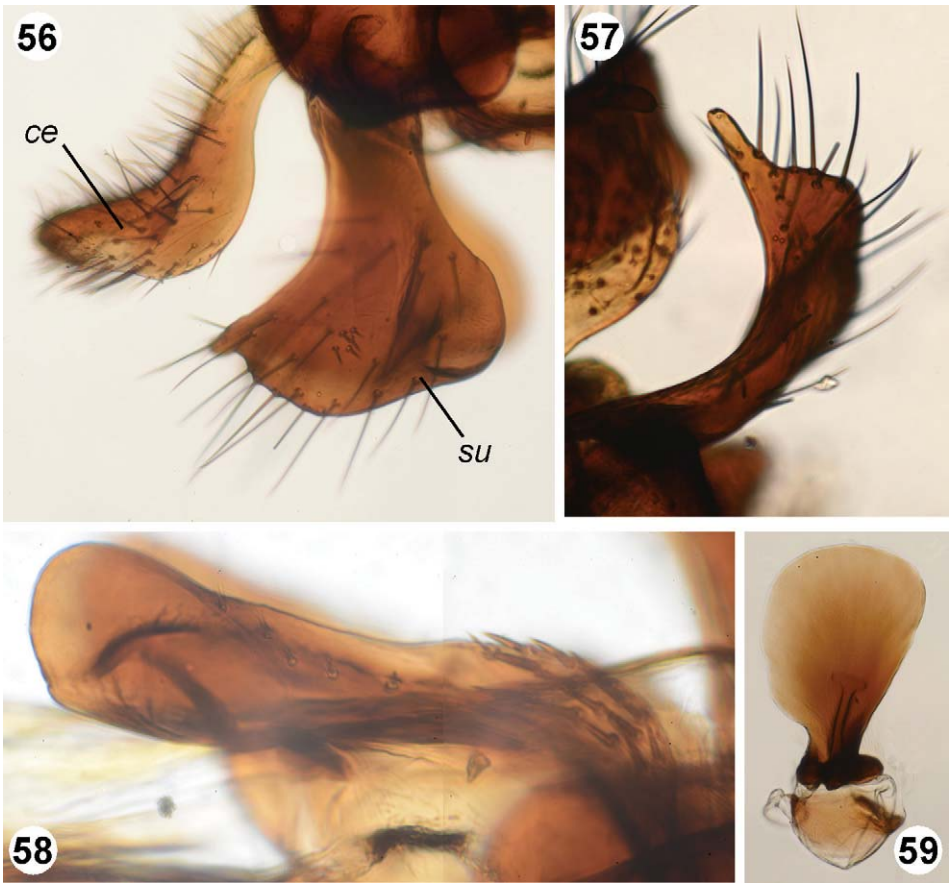
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brown-yellow, with 2 proclinate fronto-orbital setae. Antenna brown, basal flagellomere yellow-brown ventrally. Arista dark brown, only 2 segments evident. Arista situated at apex of basal flagellomere (Fig. 54). No setulae on scapus. Pedicellus with short dorsal setulae. Shape of antenna as illustrated in Fig. 54. One distinct black vertical seta. Face dark brown, with silver pruinosity. Occiput brown, slightly silver pruinose; with single



Figs 51–55. *Stylogaster copelandi* sp. n. (♂ holotype): (51) habitus, lateral view; (52) abdomen, lateral view; (53) wing; (54) antenna, lateral view; (55) frons. Not to scale.

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Figs 56–59. Terminalia (♂) of *Stylogaster copelandi* sp. n. (holotype): (56) surstylus and cercus, lateral view; (57) same, dorsolateral view; (58) phallus sheath of hypandrium, lateral view; (59) sperm pump and ejaculatory apodeme. Abbreviations: *ce* – cercus; *su* – surstylus. Not to scale.

inconspicuous black setulae. Some long black setulae on mouth opening. Proboscis mainly brown, except for black labrum and labellum, white at distal division. Labrum *ca* 1.5 mm, labellum about the same length.

Thorax: Dark brown. All setae black. One notopleural seta (a second may occur, but not evident on specimen), 1 supra-alar seta, 2 postalar seta, 1 praescutellar dorsocentral seta, 1 apical scutellar seta, 1 seta on anepimeron and 1 seta above fore coxa on propleuron. All setae black. Black erect setulae on mesoscutum.

Wing: Length 3.2 mm. Generally clothed in microtrichia, but *bc*, base of *c*, *bm* and *cup* virtually without microtrichia. Hind margin of wing with black setulae. Venation as in Fig. 53. Haltere orange-brown, distal part sharply defined dark brown. Areas with sensillae or protuberances at base of haltere not evident in holotype.

Legs: Yellow-brown with pale brown medial band on hind femur. Legs with black setulae and black setae. Fore and mid coxae each with 1 long black seta, mid coxa additionally with some shorter setulae. Hind coxa with group of distal setae on anterior

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surface and having some short setulae laterally. Hind trochanter without teeth or conspicuous setulae. Mid femur with row of regularly-arranged and straight black setulae posteriorly in distal half. Claws yellow-brown, distally blackish brown. Pulvilli pale brown. Empodia short, pale brown.

Abdomen: Dark brown, with posterior margins of tergites 2–5 darker (Fig. 52). Tergites with long, erect, dark brown setulae. Tergite 1 with long black setulae laterally, tergite 2 on anterior margin with 4 lateral black setae on either side. Terminalia as illustrated in Figs 1, 56–59. Cercus elongated. Dorsal margin concave, distal margin straight ventrally and convex dorsally. Cercus with a less conspicuous lappet ventrally. Without conspicuous teeth or black setae ventrally. Surstylus with barely visible and non-darkened tooth in the middle of convex distal margin. Only a few, barely visible, setulae on inner surface. Phallus sheath as illustrated in Fig. 58. Clearly-defined strong setulae basally.

Female. Unknown.

Holotype: ♂ KENYA: (1) "KENYA Western Prov. / Kakamega Forest / 0°14.13'N, 34°51.87'E / 16.-23. I.2000, Malaise / trap, R. Copeland"; (2) "Holotypus / *Stylogaster* / *copelandi* ♂ / des. Stuke, 2009" (NMKE). Right hind tarsi and basal flagellomere missing. Abdomen dissected, macerated and stored in glycerine in a microvial pinned beneath the specimen. The holotype is otherwise in perfect condition.

Distribution: Only known from Kenya.

Bionomics: Sampled from the Kenyan last remnant of the Pan-African rainforest.

Stylogaster fanjae sp. n.

Figs 60–71

Etymology: The species is named in honour of Fanjahariniony (Fanja) Rambeloson (Paris), who sorted most of the material from Madagascar that was used in this study.

Diagnosis: *Stylogaster fanjae* sp. n. belongs to a group of similar species from Madagascar, having a black mesoscutum (Fig. 60), a dark brown abdomen (Fig. 61) and no additional setulae on the mid femur. The three species in this group (*S. camrasi*, *S. fanjae* sp. n. and *S. pseudofanjae* sp. n.), can easily be identified using characters of the male terminalia. *Stylogaster fanjae* sp. n. has two black teeth on the distal margin of the surstylus, no black setae at the base of the phallus sheath, setae at the cercus and a diagnostically shaped surstylus. It is very similar to *S. pseudofanjae* sp. n., which has a differently shaped surstylus, especially apparent when viewed ventrally (Fig. 68). Additionally, the dense black setulae on the ventral surface of the mid tibia (Fig. 65) distinguish *S. fanjae* sp. n. from its congeners.

Description (based on holotype):

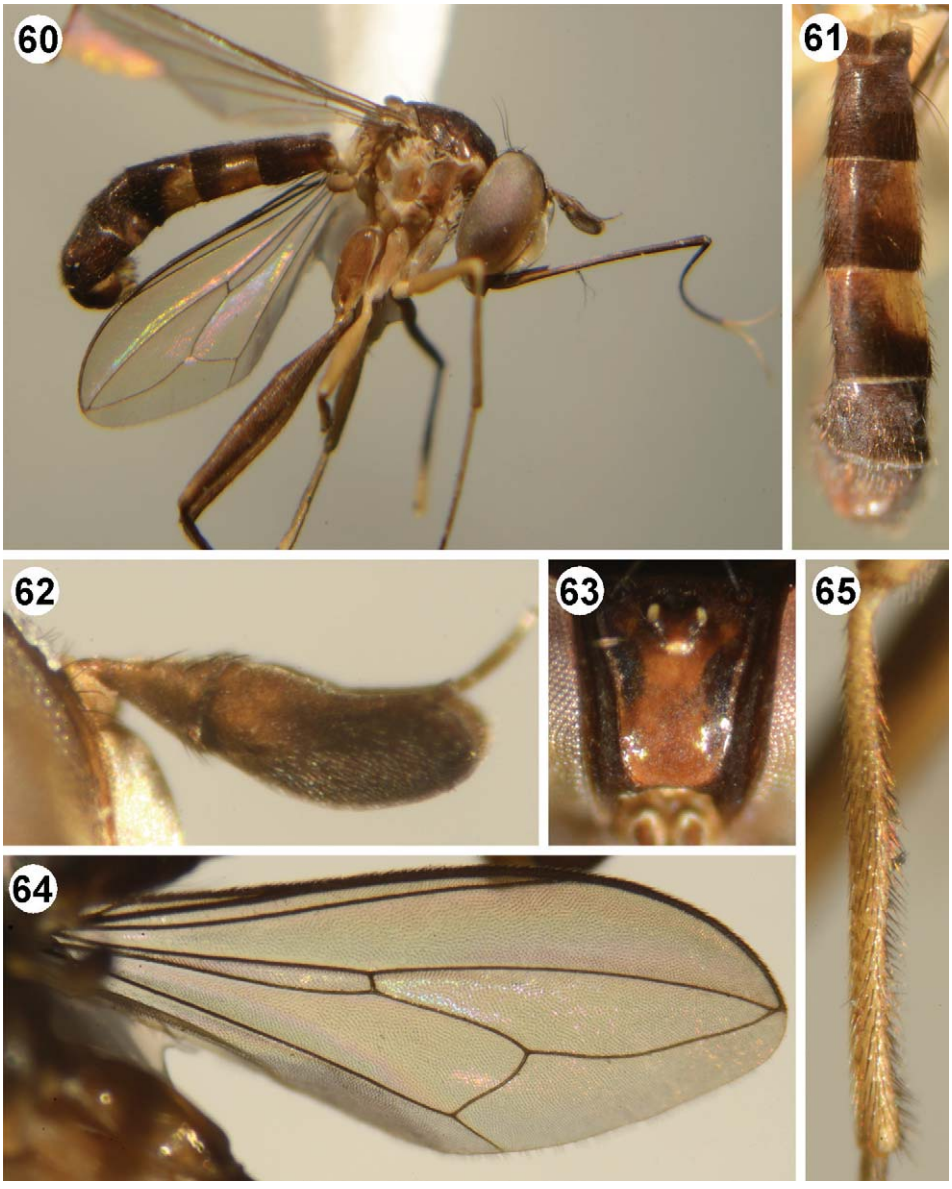
Male.

Overall length: *ca* 4.7 mm.

Head: 1.1 mm high. Eye dark brown, with a few scattered inconspicuous ommatrichia. Facets on inner side slightly enlarged. Ocelli orange-brown. Ocellar tubercle pale brown, with 1 pair of ocellar setae. Ocellar triangle occupies virtually the whole frons, reaching as far as antennae (Fig. 63). Ocellar triangle brown. Frons lateral to ocellar triangle black with only 1 small fronto-orbital seta defined. Antenna dark brown. Arista dark brown, 3 segments evident. Arista situated dorsally at apex of basal flagellomere (Fig. 62).

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Scapus with a few orange-brown setulae dorsally. Pedicellus with black setulae. Shape of antenna as illustrated in Fig. 62. One distinct black vertical seta. Face pale yellow with silver pruinosity. Occiput black to brown, distinctly silver pruinose; dorsally with line of regularly-arranged, small white setulae, ventrally with several longer white setulae. Some long white setulae on mouth opening. Proboscis pale brown basally, becoming

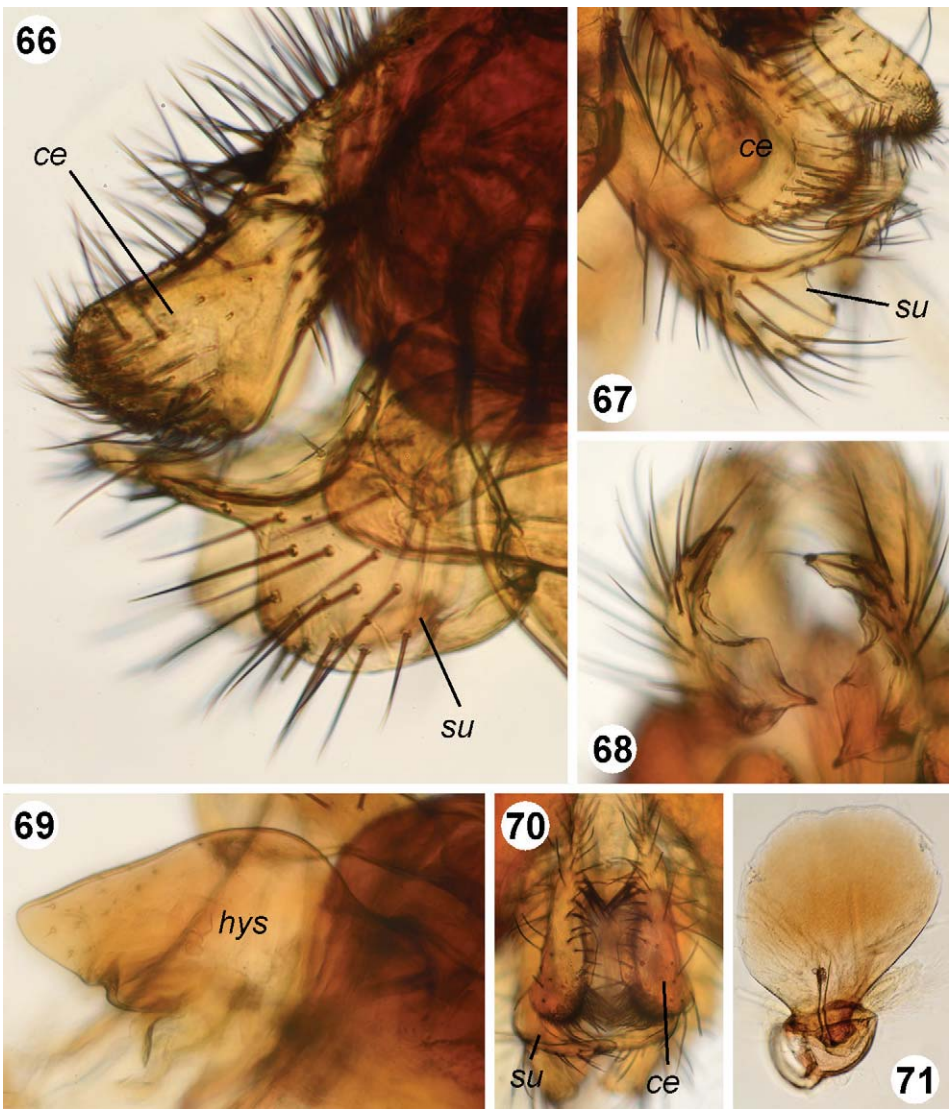


Figs 60–65. *Stylogaster fanjae* sp. n. (♂ holotype): (60) habitus, lateral view; (61) abdomen, dorsal view; (62) antenna, lateral view; (63) frons; (64) wing; (65) mid tibia, lateral view. Not to scale.

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brown distally, except for yellow-brown distal division of labellum. Labrum *ca* 2.1 mm, labellum approximately same length.

Thorax: Yellow-brown; mesoscutum (with exception of postpronotum), scutellum and mediotergite dark brown, anepisternum pale brown. All setae present on holotype black (no pleural seta, no scutellar seta, no dorsocentral seta and no supralar setae). Two notopleural setae, 1 damaged supra-alar seta, 1 postalar seta (a second may be damaged), 1 damaged praescutellar dorsocentral seta, 1 damaged apical scutellar seta, 1



Figs 66–71. Male terminalia of *Stylogaster fanjae* sp. n. (holotype): (66) surstylus and cercus, lateral view; (67) surstylus, dorsolateral view; (68) same, ventral view; (69) phallus sheath of hypandrium, lateral view; (70) cercus, dorsal view; (71) sperm pump and ejaculatory apodeme. Abbreviations: *ce* – cercus; *hys* – phallus sheath of hypandrium; *su* – surstylus. Not to scale.

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damaged seta on anepimeron and 1 damaged seta above fore coxa on propleuron. Black semi-adpressed setulae on mesoscutum.

Wing: Length 3.3 mm. Generally clothed in microtrichia, except for small area at base of r_1 and r_{2+3}, base of *br*, *bm* and base of *dm*. Hind margin of wing with black or brown setulae. Venation as in Fig. 64. Haltere uniformly pale brown with areas of sensillae at base.

Legs: Fore and mid legs yellow-brown. Hind leg darker, with a lighter ventral surface only on hind femur. Legs have mainly black or brown setulae and black setae, only fore and mid tibiae additionally with pale yellow setulae. Fore and mid coxae without distinct setae, but with strong black setulae distally. Hind coxa with 2 lateral black setulae and strong black setulae distally on anterior surface. Hind trochanter without teeth or dense setulae. Mid femur posteriorly on basal half with row of regularly-arranged black setulae. Hind tibia with 2–4 short black spines on anterior surface. Mid tibia with dense black setulae ventrally. Claws dark brown basally, distally black. Pulvilli pale yellow. Empodia short, brown.

Abdomen: Mainly dark brown, tergites 3–4 lighter brown in basal two-thirds, tergite 2 lighter brown in the basal two-thirds with exception of a darker mid fascia. Epandrium yellow-brown laterally (Fig. 61). Tergites with semi-adpressed black setulae. Tergite 1 with long white setulae laterally, tergite 2 on anterior margin with 4 or 5 black lateral setae on either side. Terminalia as illustrated in Figs 66–71. Cercus elongated (Fig. 66). Dorsal margin slightly concave. Cercus with no lappet ventrally. No conspicuous teeth ventrally. Some setae dorsally (Fig. 70). Surstylus with 2 black teeth on distal margin. No setulae on inner surface. Phallus sheath as illustrated in Fig. 69.

Female. Unknown.

Holotype: ♂ MADAGASCAR: (1) "Madagascar / Province Fianarantsoa / Parc National Ranomafana / radio tower at forest edge / elev 1130 m / 27. June-12. July 2005"; (2) "21°15.05'S 47°24.43'E / coll. M. Irwin, R. Harin'Hala / coll. California Acad. of Science / malaise, mixed tropical forest / MA-02-09B-118"; (3) "Holotypus / *Stylogaster* / *fanjae* ♂ / des. Stuke, 2011" (CAS). Left wing is torn, several tarsi and setae damaged. Abdomen dissected, macerated and stored in glycerine in a microvial pinned beneath the specimen. The holotype is otherwise in good condition.

Distribution: Endemic to Madagascar.

Bionomics: Sampled in primary rainforest at moderately high elevation (1130 m).

Stylogaster frontalis Kröber, 1914

Figs 72–76

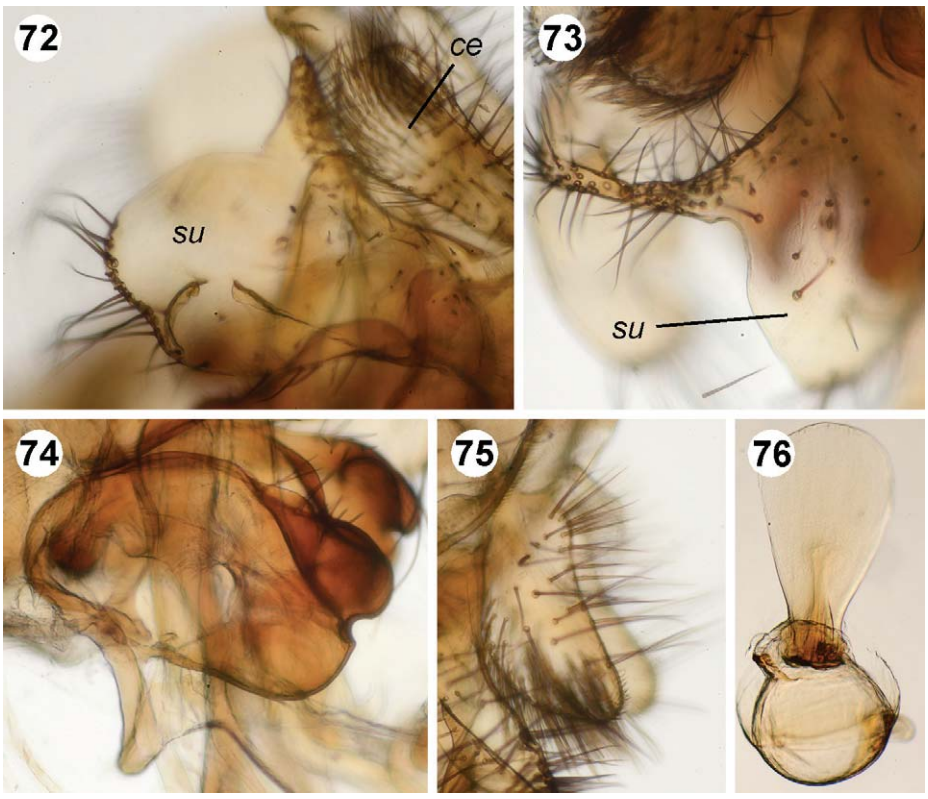
Stylogaster frontalis Kröber, 1914: 344 (Type locality: "Congo Belge: P.N.A., Masif Ruwenzori").

Literature: Camras (1962*a*), Kröber (1914, 1919, 1936), Séguy (1946), Smith (1967).

The holotype of *S. frontalis* has been lost (Smith 1967). The specimens here identified as *S. frontalis* conform to the original description perfectly and the collection locality is close to the *locus typicus* ("Belgischer Kongo, Elisabethville"). A neotype is designated here in accordance with Articles 75.3.4 and 75.1 of the ICZN (1999), in order to fix the identity of the species.

Neotype: ♂ DEMOCRATIC REPUBLIC OF THE CONGO: (1) "Congo Belge: P.N.A. / 12-II-1953 / P. Vanschuytbroek & / J. Kekenbosch 2624"; (2) "Masif Ruwenzori / Kalonge, 2.080 m / gîte Ruwenzori"; (3) "Neotypus / *Stylogaster* / *frontalis* Kröber, 1914 / des. Stuke 2011 (MRAC)". Right hind tarsi missing and several setae damaged, neotype otherwise in good condition.

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Figs 72–76. Terminalia (♂) of *Stylogaster frontalis* Kröber (Democratic Republic of the Congo, Massif Ruwenzori): (72) surstylus, lateral view; (73) same, dorsolateral view; (74) phallus sheath of hypandrium, lateral view; (75) cercus, lateral view; (76) sperm pump and ejaculatory apodeme. Abbreviations: *ce* – cercus; *su* – surstylus. Not to scale.

Additional material examined: DEMOCRATIC REPUBLIC OF THE CONGO: 1♂ same data as neotype; 1♂ Massif Ruwenzori, Camp des Gardes, Kyandolire, 1700 m, 7–15.x.1952, P. Vanschuytbroek & J. Kekenbosch (1275–84); 1♂ Massif Ruwenzori, Kalonge, gîte Ruwenzori, 2085 m, 16.iii.1957, P. Vanschuytbroek (VS 919); 1♂ Massif Ruwenzori, Kalanġe, 2210 m, 27.viii.1952, P. Vanschuytbroek & J. Kekenbosch (955) (all MRAC & J-HS); 1♂ "Tshiefu", 05°34'S 23°38'E, 23.ii.1974, R. Bauer (BMNH).

Distribution: Based on the *locus typicus* of Kröber and the material examined here, *S. frontalis* is confined to Ruwenzori Massif. Additional records of this species are reported from Liberia and Uganda by Camras (1962*a*), but Smith (1967) checked the female specimens from Uganda and found those to be closer to *S. varifrons* Malloch. The record from Liberia by Smith (1967) is based on a female and the identification remains doubtful. Currently, the known distribution of *S. frontalis* is therefore limited to the Democratic Republic of the Congo.

Stylogaster hauseri sp. n.

Figs 77–90

Etymology: The species is named in honour of Martin Hauser (Sacramento), who has supplied the author with conopids over many years.

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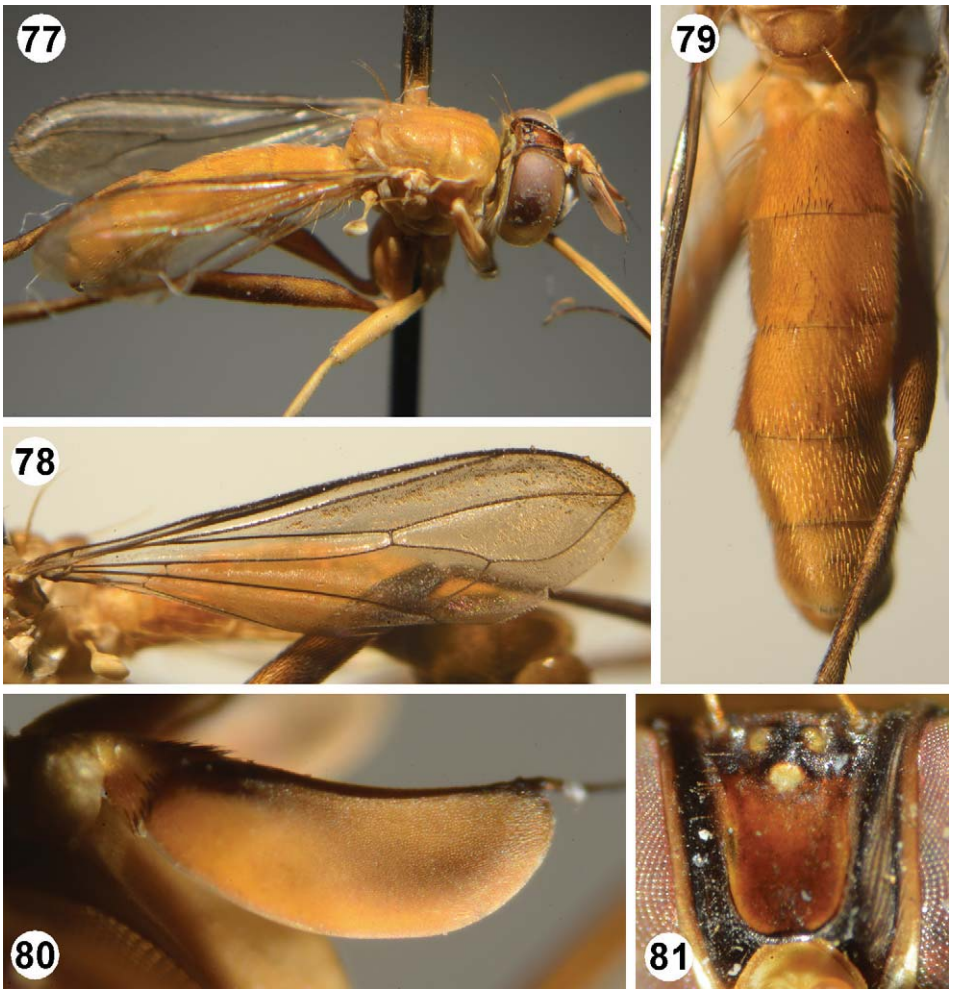
Diagnosis: The greatly enlarged basal flagellomere (Fig. 80) is unique to the species and is readily diagnostic. The male terminalia are also diagnostic (Figs 82–88), especially the unique field of small black teeth on the surstylus (Fig. 83).

Description (based on holotype):

Male.

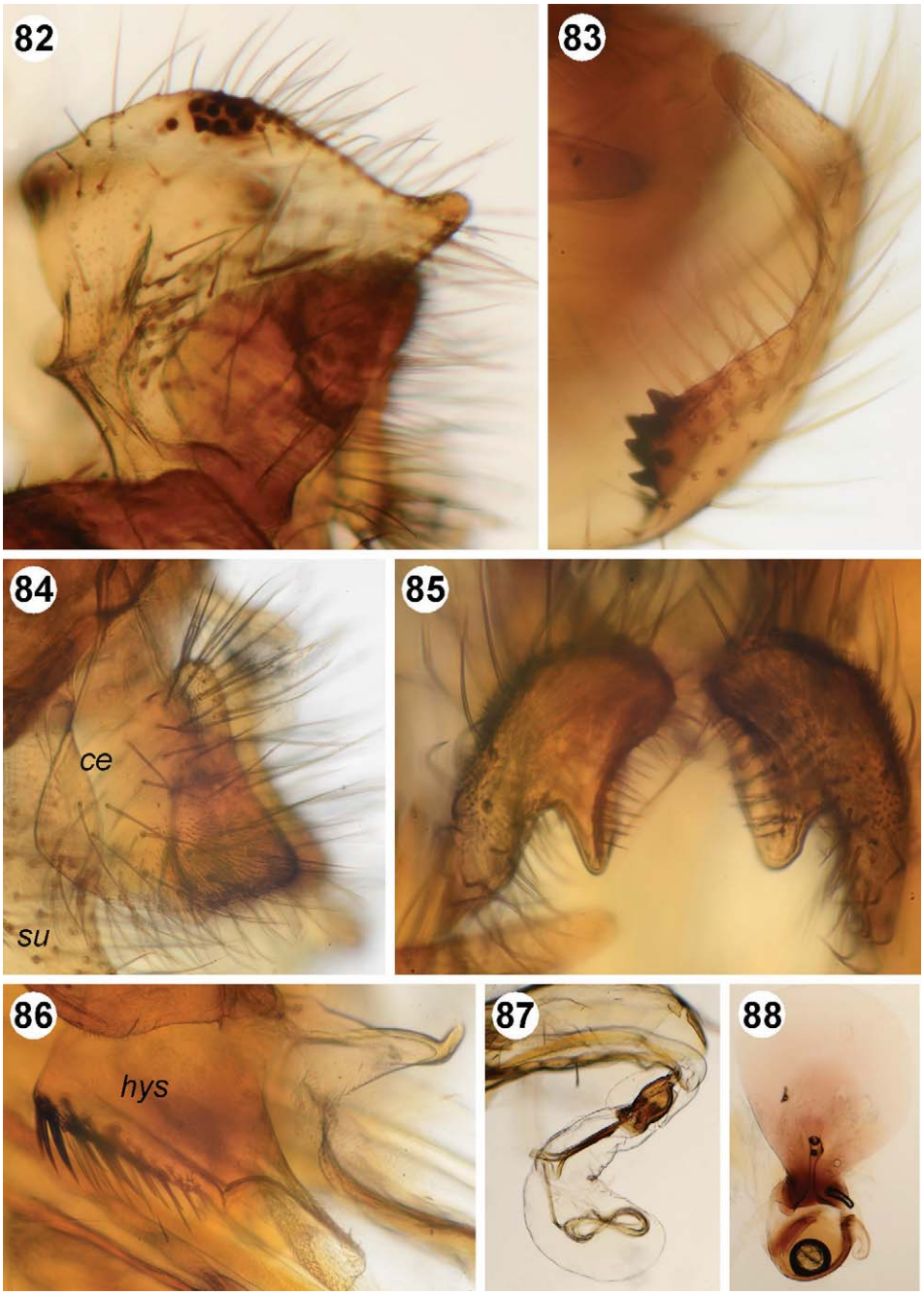
Overall length: *ca* 8.0 mm.

Head: 1.8 mm high. Eye dark brown, with a few scattered, inconspicuous ommatrichia. Facets on inner side slightly enlarged. Ocelli yellow-brown. Ocellar tubercle blackish brown, with 1 pair of inconspicuous ocellar setae. Ocellar triangle occupies virtually entire frons, reaching as far as antennae (Fig. 81). Ocellar triangle orange-brown. Frons black lateral to ocellar triangle, with 2 proclinate fronto-orbital setae. Scapus



Figs 77–81. *Stylogaster hauseri* sp. n. (♂ holotype): (77) habitus, lateral view; (78) wing; (79) abdomen, dorsal view; (80) antenna, lateral view; (81) frons. Not to scale.

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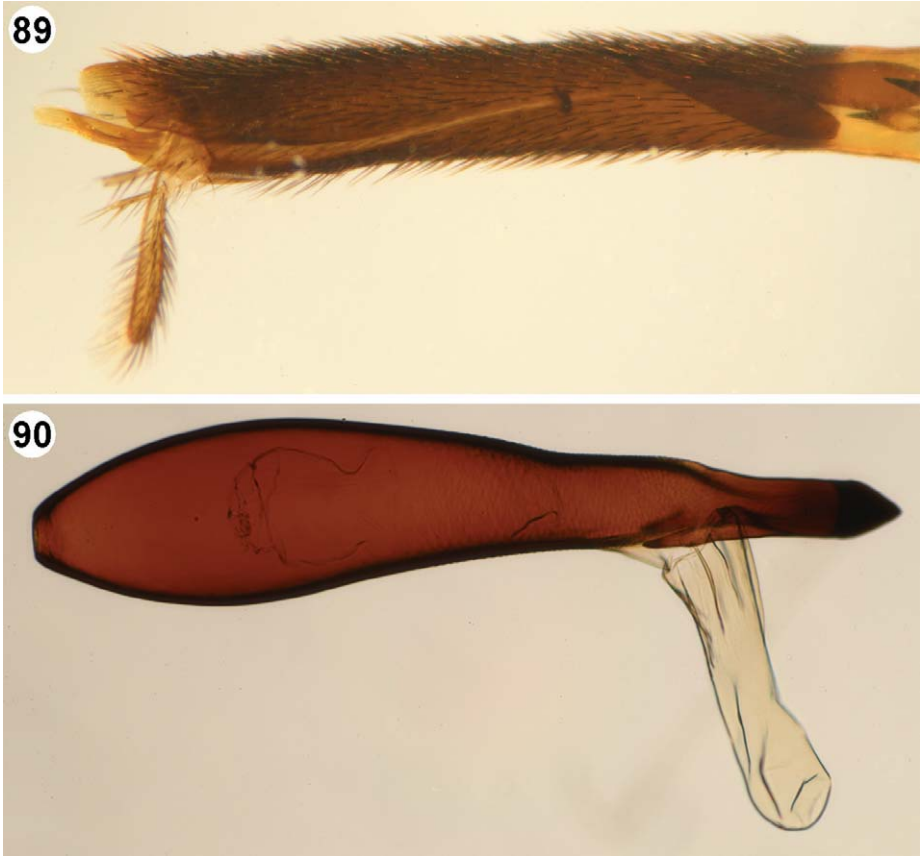
Figs 82–88. Terminalia (♂) of *Stylogaster hauseri* sp. n. (holotype): (82) surstylus, lateral view; (83) same, dorsal view; (84) cercus, lateral view; (85) same, dorsal view; (86) phallus sheath of hypandrium, lateral view; (87) phallus; (88) sperm pump and ejaculatory apodeme. Abbreviations: *ce* – cercus; *hys* – phallus sheath of hypandrium; *su* – surstylus. Not to scale.

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and pedicellus yellow-brown, basal flagellomere pale brown, darker brown on dorsal surface. Arista dark brown, black at apex, 3 segments evident. Arista situated dorsally at apex of basal flagellomere (Fig. 80). Scapus with few pale brown setulae dorsally. Pedicellus with black and golden setulae. Shape of antenna as illustrated in Fig. 80. One distinct golden vertical seta. Face pale yellow with silver pruinosity. Occiput brown, distinctly silver pruinose; dorsally with line of regularly-arranged small white setulae, ventrally with several longer white setulae. Some long white setulae on mouth opening. Proboscis mainly brown, except for yellow-brown distal division of labellum. Labrum *ca* 3.2 mm, labellum approximately same length.

Thorax: Yellow-brown. All setae golden. Two notopleural setae, 1 supra-alar seta, 2 post-alar setae, 1 (damaged) praescutellar dorsocentral seta, 1 apical scutellar seta, 1 seta on anepimeron and 1 seta above fore coxa on propleuron. Golden, semi-adpressed setulae on mesoscutum.

Wing: Length 6.0 mm. Generally clothed in microtrichia, except for *bc*, base of r_{2+3}, partly *br*, *bm*, base of *dm*, *cup* and base of anal lobe, which are virtually without microtrichia; *bc* whitish, not transparent. Hind margin of wing with black setulae. Venation as in Fig. 78. Haltere uniformly yellow-brown, with areas of sensillae at base.



Figs 89, 90. *Stylogaster hauseri* sp. n. (♀ paratype): (89) terminalia, lateral view; (90) Egg. Not to scale.

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Legs: Fore and mid legs whitish yellow, hind leg brown, with white setulae and setae, hind femur and tibia with black setulae and setae, hind coxa with golden setulae and setae. Fore and mid coxae without distinct setae, but with strong golden setulae distally. Hind coxa with strong golden setulae distally on the anterior surface and with smaller golden setulae laterally. Hind trochanter without teeth or conspicuous setulae. Mid femur with row of regularly-arranged golden setulae posteriorly in distal half. Hind tibia with single short black spines on anterior surface. Claws only narrowly yellow-brown basally, black distally. Pulvilli yellow-brown. Empodia short, pale brown.

Abdomen: Uniformly orange-brown (Fig. 79). Tergites with semi-adpressed black and golden setulae. Tergite 1 with long golden setulae laterally, tergite 2 with *ca* 10 lateral golden setae on either side at anterior margin. Terminalia as illustrated in Figs 82–88. Cercus straight dorsally (Fig. 84). Cercus with conspicuous lappet ventrally (Fig. 85). No conspicuous teeth ventrally. No black setae. Surstylus with small field of conspicuous short black spines distally (Fig. 83). Some long black setulae on inner surface. Phallus sheath as illustrated in Fig. 86. The strong black setulae basally are conspicuous.

Female.

Similar to male, differing in the following respects: facets on inner side of eye more markedly enlarged; basal flagellomere narrowly dark brown dorsally; setae and setulae on thorax and abdomen almost completely black; tergites 2–5 with darkened posterior margins (in 1 specimen). One female with white area subapically on hind tibia with few white setulae. Female terminalia illustrated in Fig. 89.

Egg (Fig. 90).

At least 157 eggs were discovered in the macerated paratype. Egg has two small, inconspicuous, poorly sclerotised lateral barbs at the extreme apex.

Holotype: ♂ MADAGASCAR: (1) "Madagascar, Fianarantsoa Prov, 17km / W Ranomafana, Vohiparara, / Ranomafana Nat'l Park, malaise in / rainforest, 25.VII–03.VIII.2002, / 1110m, R Harin'Hala, ME Irwin, / 21°13.57'S 47°22.19'E, MG 9A-36"; (2) "Holotypus / *Stylogaster* / *hauseri* ♂ / des. Stuke, 2009 (CAS)". Left front tibia, front tarsi and left mid tarsi missing. Abdomen dissected, macerated and deposited in glycerine in a microvial pinned beneath specimen, holotype otherwise in good condition.

Paratypes: MADAGASCAR: *Fianarantsoa*: 1♀ same data as for holotype, except: 15–25.v.2002; 1♀ radio tower at forest edge, 21°15.05'S 47°24.43'E, 1130 m, 15–18.iii.2006, R. Harin'Hala & M.E. Irwin, MA-02-09B-142 (both CAS); 1♀ Selle Vue, 1.2 km S Ranomafana National Park entrance, 21°15.99'S 47°25.21'E, 1095 m, 26.ii–10.iii.2003, R. Harin'Hala & M.E. Irwin, Malaise trap in rainforest, MG-9C-55 (J-HS).

Distribution: Apparently confined to Madagascar.

Bionomics: Sampled in primary rainforest at moderately high elevation (1095–1130 m).

Stylogaster hirsutifemora sp. n.

Figs 91–103

Etymology: From Latin *hirsutus* (hairy) and *femur* (thigh), referring to characteristically long setulae on the hind femur, this being an important diagnostic feature.

Diagnosis: *Stylogaster hirsutifemora* sp. n. belongs to a species-group possessing long setulae on the mid and hind femur (Fig. 94), no white setulae on the hind femur and black markings on the abdomen (Fig. 92). *Stylogaster hirsutifemora* sp. n. is distinguished from the other species in this group (*S. acanthocercus* sp. n.) by the yellow frons (Fig. 95), the unique terminalia (Figs 97–103) with 2 pairs of black spines on the ventral

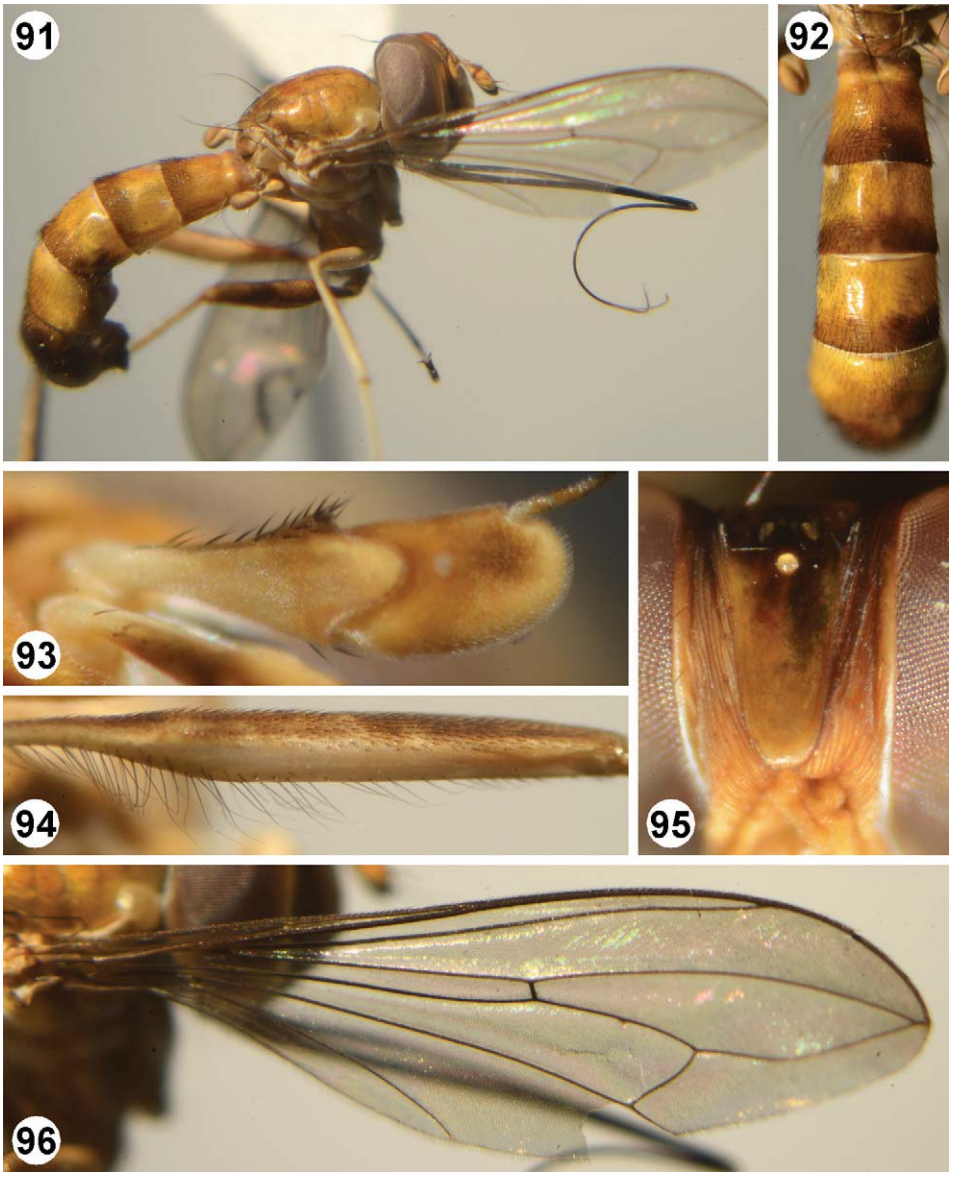
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junction of the cerci (Figs 100, 101 – spines appear fused in illustration), and the (a) hemisperical and (b) finger-like extension of the surstylus (Fig. 97).

Description (based on holotype):

Male.

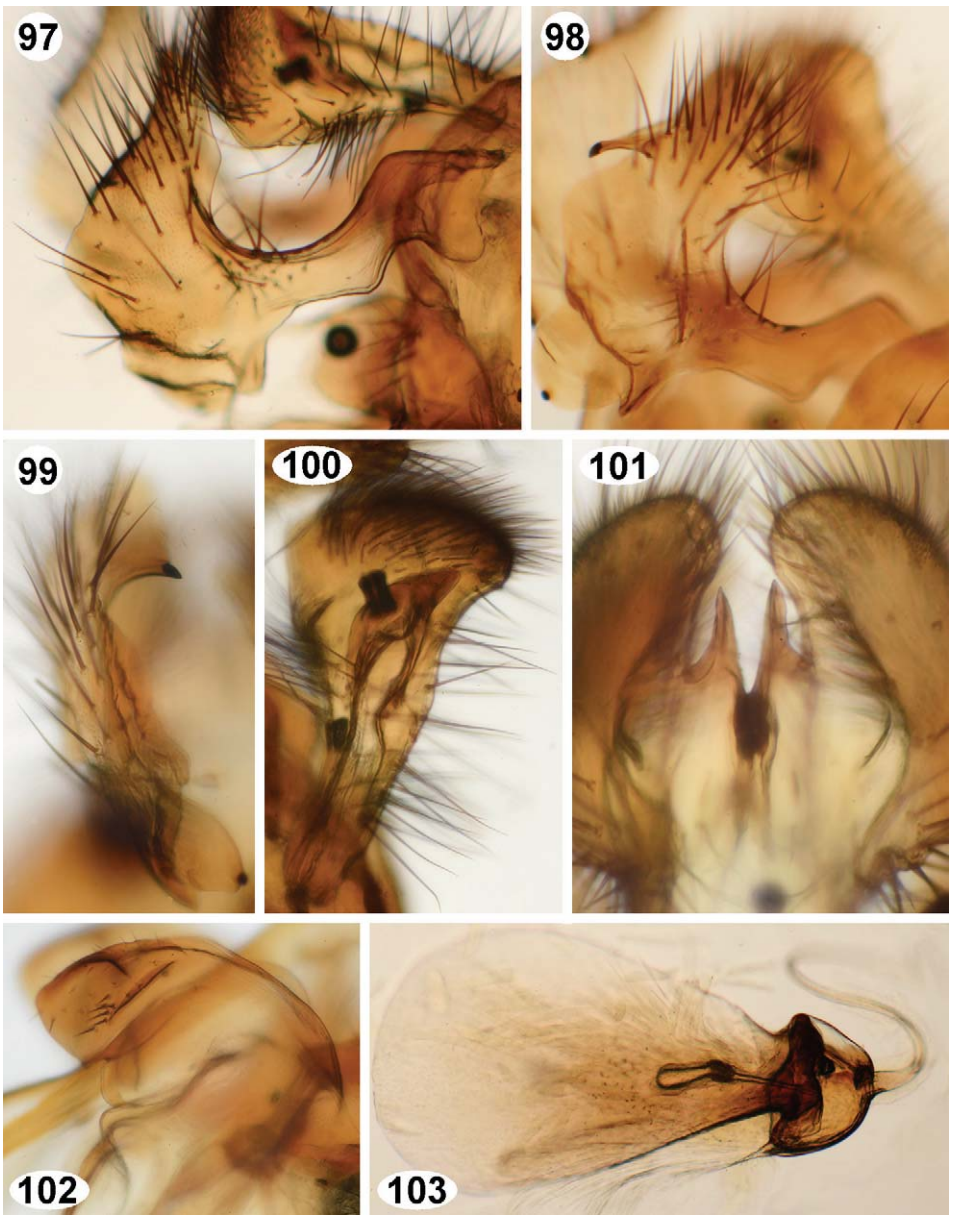
Overall length: *ca* 7.7 mm.



Figs 91–96. *Stylogaster hirsutifemora* sp. n. (♂ holotype): (91) habitus, lateral view; (92) abdomen, dorsal view; (93) antenna, lateral view; (94) hind femur, ventral view; (95) frons, dorsal view; (96) wing. Not to scale.

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Head: 1.8 mm high. Eye brown, with a few scattered, inconspicuous ommatrichia. Facets on inner side slightly enlarged. Ocelli orange-yellow. Ocellar tubercle blackish brown, with 1 pair of ocellar setae (1 damaged). Ocellar triangle occupying most of frons, but smaller distally, reaching as far as antennae (Fig. 95). Ocellar triangle dark



Figs 97–103. Terminalia (♂) of *Stylogaster hirsutifemora* sp. n. (paratype): (97) surstylus, lateral view; (98) same; (99) same, ventral view; (100) cercus, lateral view; (101) teeth at ventral conjunction of cerci, dorsal view (spines appear fused); (102) phallus sheath of hypandrium, lateral view; (103) sperm pump and ejaculatory apodeme. Not to scale.

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brown basally, pale brown distally. Frons orange-brown lateral to ocellar triangle, with 2 defined fronto-orbital setae. Scapus and pedicellus yellow-orange, basal flagellomere slightly darker. Arista yellow-brown basally becoming black distally, 3 segments evident. Arista situated dorsally at apex of basal flagellomere (Fig. 93). Scapus with few black setulae dorsally. Pedicellus with black setulae. Shape of antenna as illustrated in Fig. 93. One distinct black vertical seta (1 damaged). Face pale yellow with silver pruinosity. Occiput black, distinctly silver pruinose; with row of regularly-arranged small white setulae dorsally and ventrally with several longer white setulae. Some long white setulae on mouth opening. Proboscis yellow-brown basally, becoming dark brown distally, but yellow-brown distal division of labellum. Labrum *ca* 3.7 mm, labellum approximately same length.

Thorax: Yellow-white; mesoscutum (with exception of postpronotum), scutellum and mediotergite orange-brown. All setae black, with exception of golden setae on propleuron and anepimeron. Two notopleural setae, 1 supra-alar seta, 2 postalar setae, 1 praescutellar dorsocentral seta, 1 apical scutellar seta (1 damaged), 1 seta on anepimeron (1 damaged) and 1 seta above fore coxa on propleuron (1 damaged). A few black setulae on anepimeron. Short black semi-adpressed setulae on mesoscutum.

Wing: Length 6.1 mm. Generally clothed in microtrichia, except for base of r_1 and r_{2+3}, partly *br*, *bm*, base of *dm*, *cup*, base of cua_1 and base of anal lobe. Hind margin of wing with black or brown setulae. Venation as in Fig. 96. Haltere uniformly pale yellow, knob brown, with areas of sensillae at base. Fore leg damaged. Mid leg pale yellow-white. Hind leg pale brown dorsally, hind tibia white distally, contrasting with black hind tarsi.

Legs: Mainly with black or brown setulae, only mid tibia with pale yellow setulae. Setae on fore and mid coxae white, setae on hind coxa black. Fore and mid coxae without distinct setae, but with strong white setulae distally. Hind coxa with 1 short lateral black seta, and with strong black setulae distally on anterior surface. Hind trochanter with dense black setulae. Mid femur with row of regularly-arranged black setulae posteriorly on basal half, and black setulae ventrally, slightly longer than diameter of mid tibia. Mid tibia with short, dense black setulae ventrally. Hind femur with long black setulae posteroventrally. Hind tibia with 4 short black spines on anterior surface. Claws dark brown basally, black distally. Pulvilli orange-brown. Empodia short, orange-brown.

Abdomen: Mainly pale yellow, tergite 1 mostly brown, tergites 2–4 with brown hind margin, tergite 6 mainly brown, epandrium pale brown laterally (Fig. 92). Tergites with semi-adpressed black setulae. Tergite 1 with long white setulae laterally, tergite 2 with 5 white lateral setae on either side of anterior margin. Abdomen of holotype not dissected, but apparently matches terminalia of a paratype.Terminalia as in Figs 97–103. Cercus rounded distally (Fig. 100). Dorsal margin slightly concave. Cercus with 2 pairs of blunt, black spines and long spines (Figs 100, 101). Surstylus with 2 black spines, 1 situated on a small evagination and other on hemispherical broad extension. Some setulae on inner surface of base of the surstylus. Phallus sheath as illustrated in Fig. 102.

Female. Unknown.

Holotype: ♂ MADAGASCAR: (1) "Madagascar: Prov. Antananarivbo, 46 km NE / of Ankazobe: Ambohitantely, 700m, 1-14.XI.2004 / 18°11.88S, 47°16.89E, Irwin, Harin H'Hala / malaise trap in sclerophyl forest. MG 27-20"; (2) "CASLOT 021141"; (3) "Holotypus / *Stylogaster* / *hirsutifemora* ♂ / des. Stuke, 2011 (CAS)". Fore legs damaged, left hind tarsi damaged, some setae damaged. Abdomen dissected,

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macerated and deposited in glycerine in a microvial pinned beneath specimen, holotype otherwise in reasonable condition.

Paratypes: MADAGASCAR: 2♂ same data as for holotype, except 6–8.ii.2005 (CAS & J-HS).

Distribution: Endemic to Madagascar.

Bionomics: Sampled in sclerophyl forest at low elevation (700 m).

Stylogaster irwini sp. n.

Figs 104–114

Etymology: The species is named in honour of Michael E. Irwin (Vail, Arizona), who organized "An Arthropod Survey of Madagascar's Protected Areas (1998–2009)", and collected numerous conopids used in this study.

Diagnosis: *Stylogaster irwini* sp. n. does not possess ocellar setae, this being an excellent character to distinguish the species from any Afrotropical *Stylogaster*. The new species also has diagnostic terminalia, with dense, strong, black setulae at the apex of the surstylus (Fig. 109), strong spines on the ventral conjunction of the cerci (Fig. 112) and no conspicuous setulae or setae on the phallus sheath (Fig. 113).

Description (based on holotype):

Male.

Overall length: *ca* 6.5 mm.

Head: 1.7 mm high. Eye pale brown, with a few scattered, inconspicuous ommatrichia. Facets on inner side slightly enlarged. Ocelli yellow-brown. Ocellar tubercle brown, without ocellar setae. Ocellar triangle occupies virtually entire frons, reaching as far as antennae (Fig. 106). Ocellar triangle yellow, with some pale brown maculae (Fig. 106). Frons lateral to ocellar triangle yellow, with 1–3 small, defined, fronto-orbital setae. Scapus and pedicellus pale yellow, basal flagellomere orange-brown. Arista with 3 segments, two pale yellow basally, and brown distally. Arista situated dorsally at apex of basal flagellomere (Fig. 105). Scapus with few black setulae dorsally. Pedicellus with black setulae. Shape of antenna as illustrated in Fig. 105. One damaged vertical seta. Face pale yellow with silver pruinosity. Occiput pale brown, distinctly silver pruinose; with row of regularly-arranged small white setulae dorsally, and several longer white setulae ventrally. Some long white setulae on mouth opening. Proboscis pale brown basally, becoming dark brown distally, except for the yellow-brown distal division of labellum. Labrum *ca* 2.6 mm, labellum approximately same length.

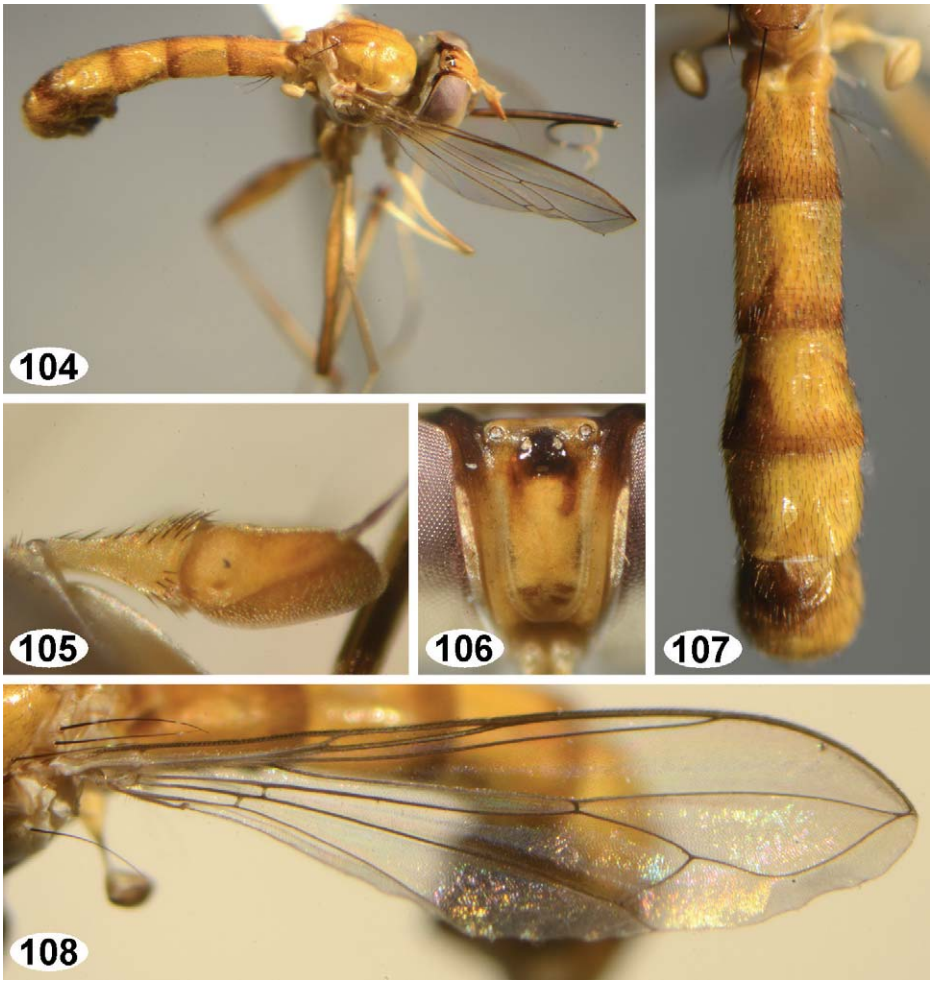
Thorax: Yellow-brown; mesoscutum (with exception of postpronotum and postalar calli) and anepisternum orange-brown. All setae black, with exception of golden seta on propleuron. Two notopleural setae (the ventral less than half length of dorsal), 1 supra-alar seta (1 damaged), 2 postalar setae (4 damaged), 1 praescutellar dorsocentral seta (1 damaged), 1 apical scutellar seta (1 damaged), 1 seta on anepimeron and 1 seta above fore coxa on propleuron. A few black setulae on anepimeron. Black semi-adpressed setulae on mesoscutum.

Wing: Length 4.7 mm. Generally clothed in microtrichia, but base of *sc*, base of r_1 and r_{2+3}, part of *br*, *bm*, base of *dm* and *cup* without microtrichia. Hind margin of wing with black or brown setulae. Venation as in Fig. 108. Haltere uniformly pale yellow, knob slightly darker, with areas of sensillae at base.

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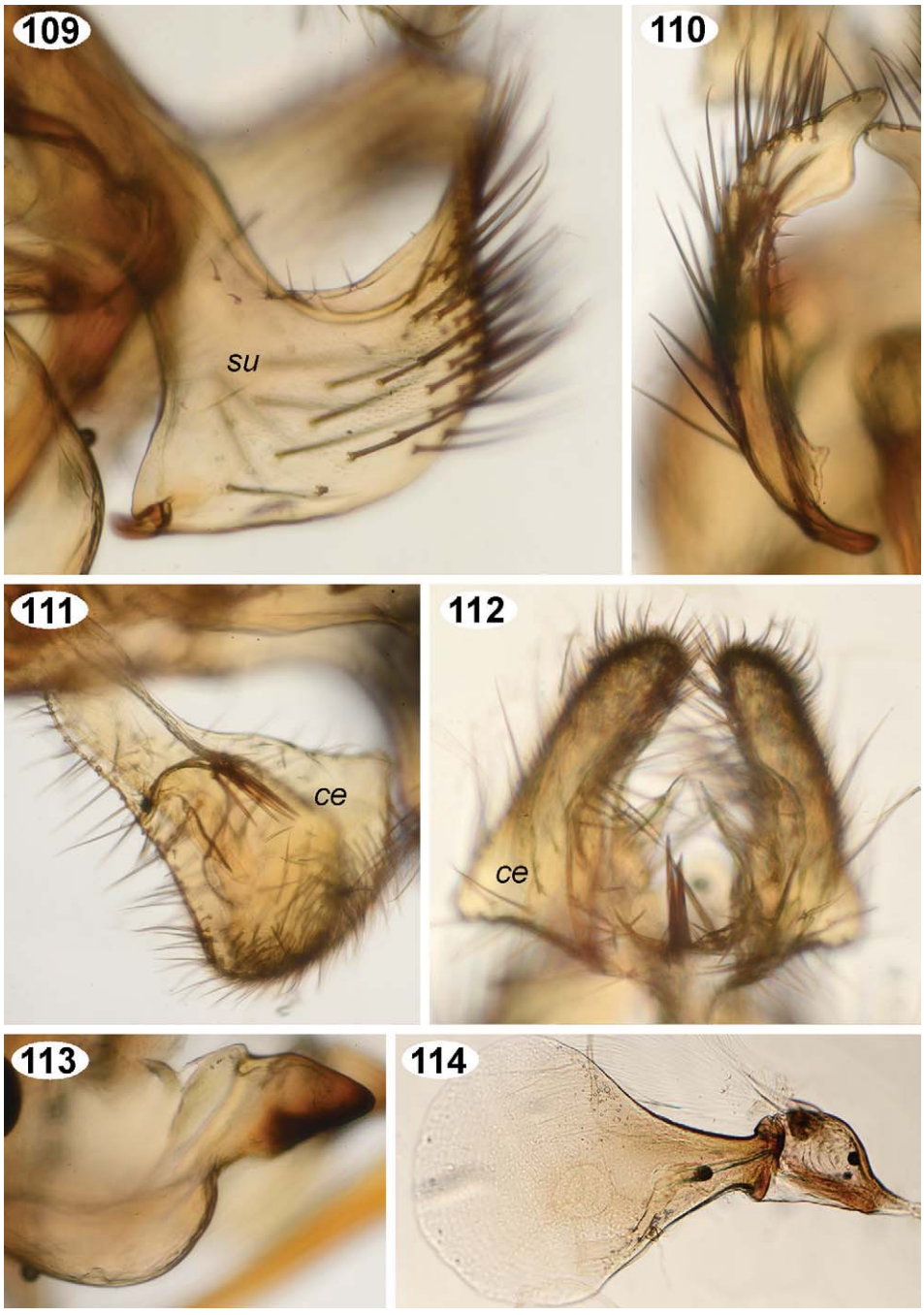
Legs: Fore and mid legs pale yellow-white. Hind leg yellow-brown, hind tibia with yellow-white subapical area, tarsi black. Fore and mid legs with white and black setulae, hind leg with black setulae only. Setae on fore coxa white and black, mid coxa with white setae, hind coxa with black setae. Fore coxa with 3 distinct setae and several white setulae. Mid coxa with 1 white seta and additional white setulae. Hind coxa with lateral black seta and additionally with strong black setulae distally on anterior surface. Hind trochanter without teeth or dense setulae. Mid femur posteriorly on basal half with row of regularly-arranged black setulae and also a few longer setulae on ventral surface. Hind tibia with 3 or 4 short black spines on anterior surface. Claws dark brown basally, black distally. Pulvilli pale yellow-white. Empodia short, pale yellow-white.

Abdomen: Mainly orange-brown, tergites 2–4 with brown hind margin, tergite 6 pale brown medially (Fig. 107). Tergites with semi-adpressed black setulae. Tergite 1 with



Figs 104–108. *Stylogaster irwini* sp. n.: (104) habitus, lateral view (♂ holotype); (105) antenna, lateral view (♂ holotype); (106) frons (♂ holotype); (107) abdomen, dorsal view (♂ holotype); (108) wing (♂ paratype, *locus typicus*). Not to scale.

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Figs 109–114. Terminalia (♂) of *Stylogaster irwini* sp. n. (paratype from *locus typicus*): (109) surstylus, lateral view; (110) same, ventral view; (111) cercus, lateral view; (112) teeth at ventral conjunction of cerci, dorsal view; (113) phallus sheath of hypandrium, lateral view; (114) sperm pump and ejaculatory apodeme. Abbreviations: *ce* – cercus; *su* – surstylus. Not to scale.

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long white setulae laterally, tergite 2 with 4 or 5 black lateral setae on either side of anterior margin. Abdomen of holotype not dissected, but terminalia apparently match those of a paratype. Terminalia as illustrated in Figs 109–114. Cercus triangular (Fig. 111). Dorsal margin virtually straight. Cercus with long setae ventrally (Fig. 112). No black setae. Surstylus with slightly sclerotized long tooth. No setulae on inner surface. Phallus sheath as illustrated in Fig. 113. The black colouration at apex is conspicuous.

Female. Unknown.

Holotype: ♂ MADAGASCAR: (1) "MADAGASCAR: Toliara Prov. / Fiherenana, 18.-22.VII.2003 / 23°10.619'S 43°57.685'E / colls: Frontier Wilderness Prj. / ex: malaise trap MGF078"; (2) "CASLOT 044922"; (3) "Holotypus / *Stylogaster* / *irwini* ♂ / des. Stuke, 2011 (CAS)". Most hind tarsal segments and some setae damaged, holotype otherwise in good condition.

Paratypes: MADAGASCAR: *Toliara*: 4♂ same as holotype (CAS & J-HS); 1♂ Majunga Ampijoroa National Park, 160 km N of Maevatananaon RN 443 m, 16°19.16'S 46°48.80'E, 8–17.xii.2002, deciduous dry forest, M. Irwin & R. Harin'Hala, Malaise trap (CAS); 1♂ Ampijoroa, Mahajanga, 11.i.1995, M. & E. Howe (DC).

Distribution: Endemic to Madagascar.

Bionomics: Sampled in deciduous dry forest at low elevation (443 m).

Stylogaster kakamegensis sp. n.

Figs 115–124

Etymology: The species is named after the *locus typicus*, Kakamega Forest in western Kenya and the surrounding area of highly endangered tropical rainforest.

Diagnosis: *Stylogaster kakamegensis* sp. n. belongs to a group of species occurring in central and East Africa, that lack additional outstanding setulae on the mid femur and have a mainly black mesoscutum (Fig. 115), partly brown tergites and tergite 6 almost completely brown. There are two additional species in this group, viz. *S. kenyensis* sp. n. and *S. nitens*. The former species can be separated on the basis of the pale yellow-brown margin of the mesoscutum (Fig. 125) and the elongated pedicellus, being longer than the basal flagellomere (Fig. 126). The later species can by separated by the structure of the ♂ terminalia, as illustrated by Stuckenberg (1963: 270, figs 10, 13, as *parva*) and Smith (1967: 57, fig. 40), having no teeth at the distal margin of the surstylus, a different form of the surstylus and black setae at the base of the phallus sheath of the hypandrium.

Description (based on holotype):

Male.

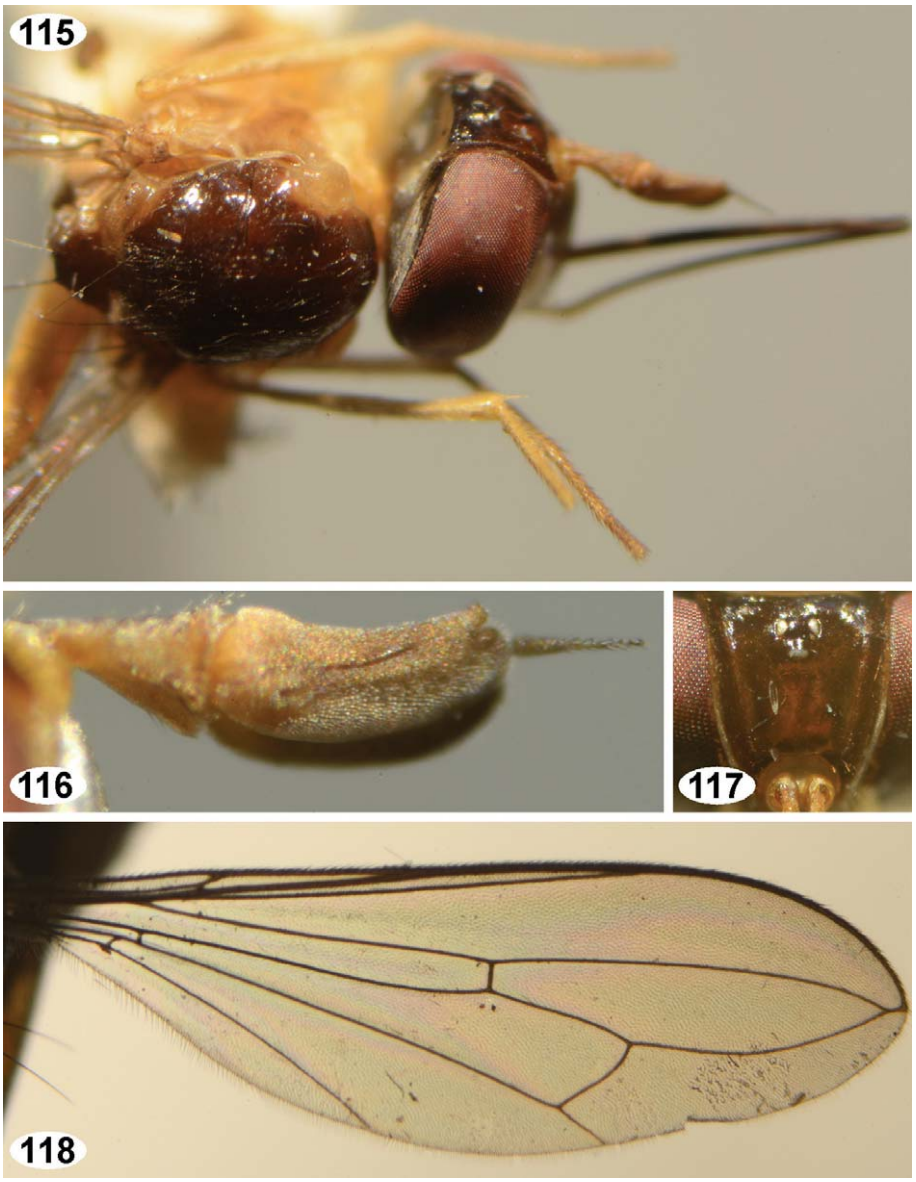
Overall length *ca* 6.5 mm.

Head: 1.2 mm high. Eye dark brown, with a few scattered inconspicuous ommatrichia. Facets on the inner side slightly enlarged. Ocelli yellow-brown. Ocellar tubercle blackish brown, paired ocellar setae could be located. Ocellar triangle occupies virtually entire frons and reaches as far as antennae (Fig. 117). Ocellar triangle dark brown. Frons lateral to ocellar triangle dark brown with a single fronto-orbital seta discernible. Scapus and pedicellus orange-brown, basal flagellomere brown. Arista dark brown, 3 segments evident. Arista situated dorsally at apex of basal flagellomere (Fig. 116). Scapus without conspicuous setulae. Pedicellus with black setulae. Shape of antenna as illustrated in Fig. 116. One damaged vertical seta. Face pale yellow with silver pruinosity. Occiput black and only slightly pruinose; with row of regularly-arranged small black setulae dorsally, and with very few white setulae ventrally. Some long white setulae on mouth

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opening. Proboscis pale brown basally, becoming blackish brown distally, except for yellow-brown distal division of labellum. Labrum *ca* 1.7 mm, labellum approximately same length.

Thorax: Yellow-brown; the mesoscutum (with exception of postpronotum and postalar callus), scutellum and mediotergite black. All undamaged setae black. Two notopleural setae, 1 damaged supra-alar seta, 2 postalar setae, 1 praescutellar dorsocentral seta, 1



Figs 115–118. *Stylogaster kakamegensis* sp. n. (♂ holotype): (115) thorax, dorsal view; (116) antenna, lateral view; (117) frons; (118) wing. Not to scale.

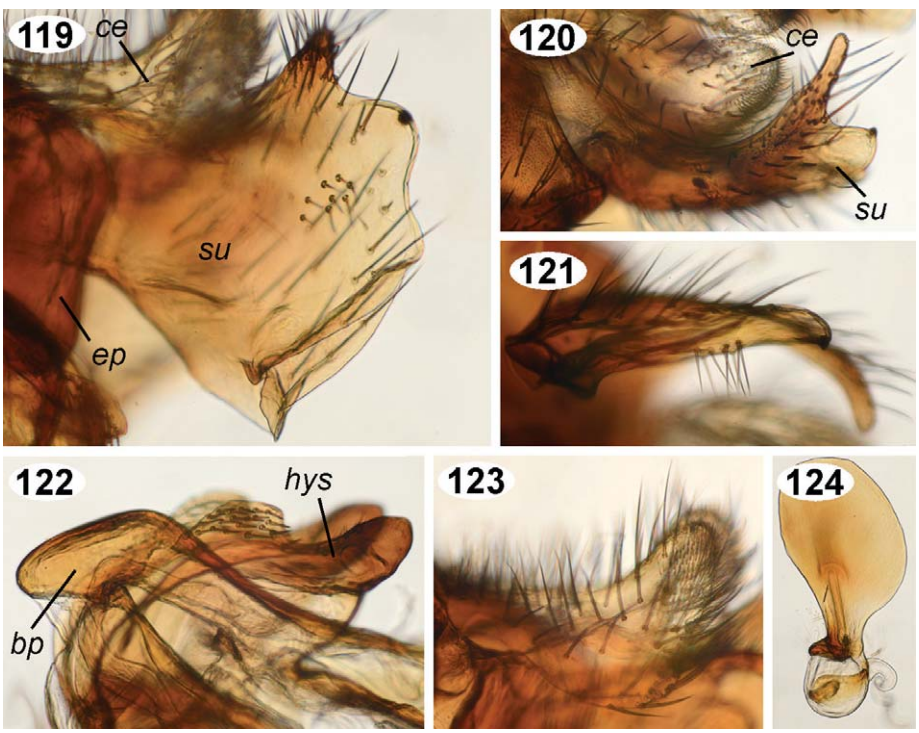
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apical scutellar seta, no seta on anepimeron and 1 seta above fore coxa on propleuron. All setae on left side damaged, except praescutellar dorsocentral seta and apical scutellar seta. Black semi-adpressed setulae on mesoscutum.

Wing: Length 4.6 mm. Generally clothed in microtrichia, except for base of *sc*, base of r_1 and very narrowly at base of r_{2+3}, *br*, *bm*, very narrowly at base of *dm* and *cup*. Hind margin of wing with black or brown setulae. Venation as in Fig. 118. Haltere uniformly yellow-brown basally, knob brown, with areas of sensillae at base.

Legs: Fore and mid legs yellow-brown. Hind leg darker, with brown dorsal surface of hind femur and brown hind tarsi. Legs mainly with black or brown setulae and black setae, only fore tibia additionally with pale yellow setulae. Fore and mid coxae each with 1 distinct black seta. Hind coxa distally on anterior surface with strong brown setulae, without outstanding lateral seta. Hind trochanter without teeth or dense setulae. Mid femur posteriorly on basal half with row of regularly-arranged pale brown setulae. Hind tibia with 2 short black spines on anterior surface. Claws brown basally, distally black. Pulvilli pale brown. Empodia short, pale brown.

Abdomen: Mainly orange-brown, tergites 1–2 entirely brown, tergites 3–4 with brown posterior margins and brown fascia medially, tergite 5 with broad brown fascia medially and tergite 6 brown with except for lateral margins. Tergites with semi-adpressed black



Figs 119–124. Terminalia (♂) of *Stylogaster kakamegensis* sp. n. (♂ holotype): (119) surstylus, lateral view; (120) same, dorsolateral view; (121) same, ventral view; (122) phallus sheath of hypandrium, lateral view; (123) cercus, lateral view; (124) sperm pump and ejaculatory apodeme. Abbreviations: *bp* – basiphallus; *ce* – cercus; *ep* – epandrium; *hys* – phallus sheath of hypandrium; *su* – surstylus. Not to scale.

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setulae. Tergite 1 with long black setulae laterally, tergite 2 on anterior margin with 3 black lateral setae on either side. Terminalia as illustrated in Figs 119–124. Cercus short, rounded distally (Fig. 123). Dorsal margin slightly concave. Cercus with lappet ventrally that bears conspicuous, strong, short setulae. Surstylus with 1 short black tooth on distal margin (Fig. 119). A small field with long, erect, setulae on inner surface (Fig. 121). Phallus sheath as illustrated in Fig. 122.

Female. Unknown.

Holotype: ♂ KENYA: (1) "Kakamega / forest, / 5200 feet"; (2) "Kenya: / 18.xii.1970 / A.E. Stubbs / B.M. 1972–211"; (3) "Holotypus / *Stylogaster* / *kakamegensis* ♂ / des. Stuke, 2011" (BMNH). Right fore and mid tarsi and some setae damaged, right arista missing. Abdomen dissected, macerated and deposited in glycerine in a microvial pinned beneath specimen, holotype otherwise in reasonable condition.

Distribution: Known only known from Kakamega Forest in western Kenya.

Bionomics: Sampled from the Kenyan last remnant of the ancient Pan-African forest.

Stylogaster kenyensis sp. n.

Figs 125–135

Etymology: The species is named after the state of Kenya, from which the type material originates.

Diagnosis: *Stylogaster kenyensis* sp. n. belongs to a group of species occurring in central and East Africa that lack additional outstanding setulae on the mid femur and have a mainly black mesoscutum (Fig. 125), partly brown tergites and tergite 6 almost completely brown. The other two species belonging to this group, *S. kakamegensis* sp. n. and *S. nitens*, differ from *S. kenyensis* sp. n. in having the mesoscutum black posteriorly to the lateral margin (Fig. 115) and a basal flagellomere longer than the pedicellus (Fig. 116). The ♂ terminalia are typically as illustrated in Figs 129–135.

Description (based on holotype):

Male.

Overall length: *ca* 6.0 mm.

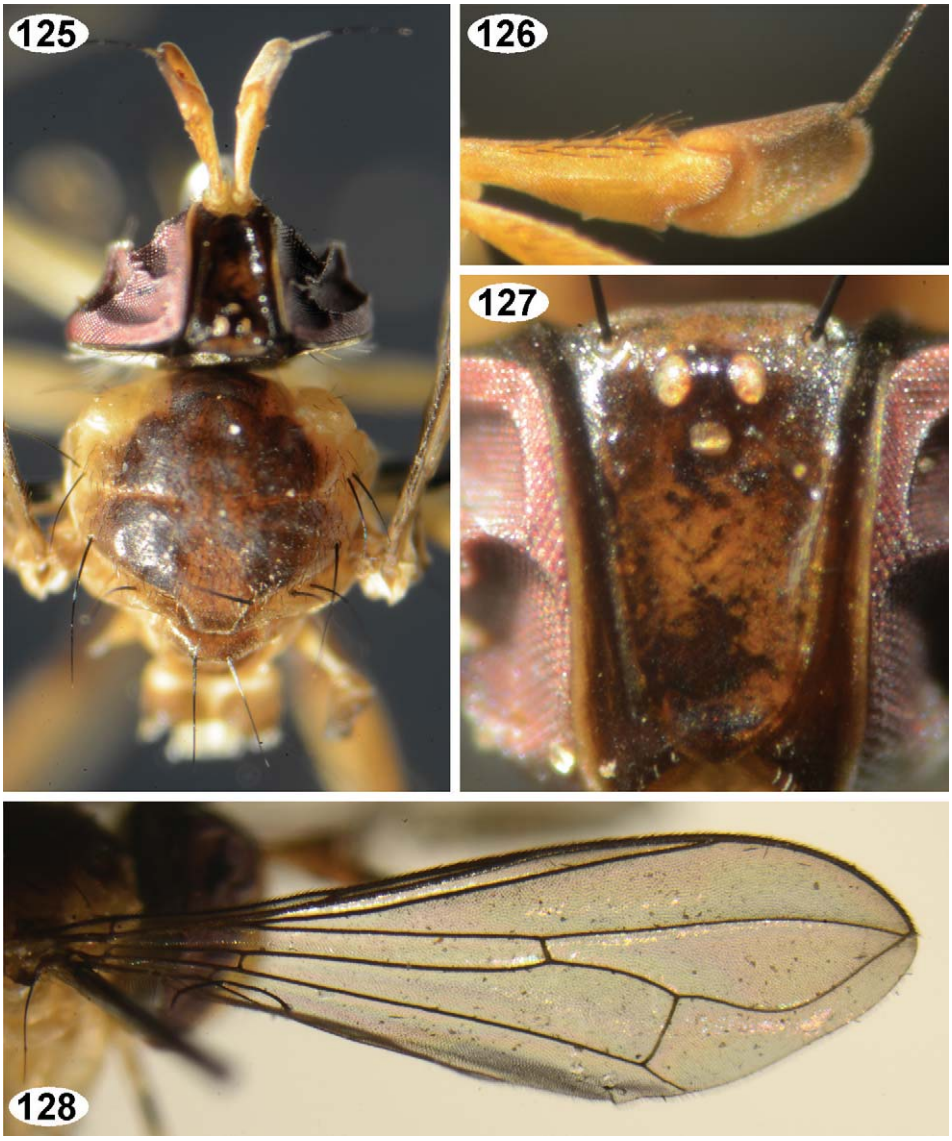
Head: 1.3 mm high. Eye dark brown, with a few scattered inconspicuous ommatrichia. Facets on inner side slightly enlarged. Ocelli orange-brown. Ocellar tubercle blackish brown, with 1 pair of ocellar setae. Ocellar triangle occupies virtually entire frons, reaching as far as antennae (Fig. 127). Ocellar triangle dark brown. Frons brown lateral to blackish ocellar triangle, with only 2 small, defined, fronto-orbital setae. Scapus and pedicellus orange-brown, basal flagellomere brown in distal two-thirds. Arista dark brown, 3 segments evident. Arista situated dorsally at apex of basal flagellomere (Fig. 126). Scapus with few orange-brown setulae dorsally. Pedicellus with black setulae. Shape of antenna as illustrated in Fig. 126. One distinct black vertical seta. Face pale yellow with silver pruinosity. Occiput black to brown, distinctly silver pruinose; with row of regularly-arranged small white setulae dorsally, and several longer white setulae ventrally. Some long black setulae on mouth opening. Proboscis pale brown basally, becoming blackish brown distally, except for yellow-brown distal division of labellum. Labrum *ca* 2.9 mm, labellum approximately same length.

Thorax: Yellow-brown; mesoscutum (with exception of postpronotum, lateral margins and postalar callus), scutellum and mediotergite black. All setae black. Two notopleural

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setae, 1 supra-alar seta, 2 postalar setae, 1 praescutellar dorsocentral seta, 1 apical scutellar seta, 1 seta on anepimeron and 1 seta above fore coxa on propleuron. Black semi-adpressed setulae on mesoscutum.

Wing: Length 5.1 mm. Generally clothed in microtrichia, except for base of r_1 and r_{2+3}, base of *br*, *bm*, very narrowly at base of *dm* and *cup*. Hind margin of wing with black or brown setulae. Venation as in Fig. 128. Haltere uniformly yellow-brown basally, knob brown, with areas of sensillae at base.

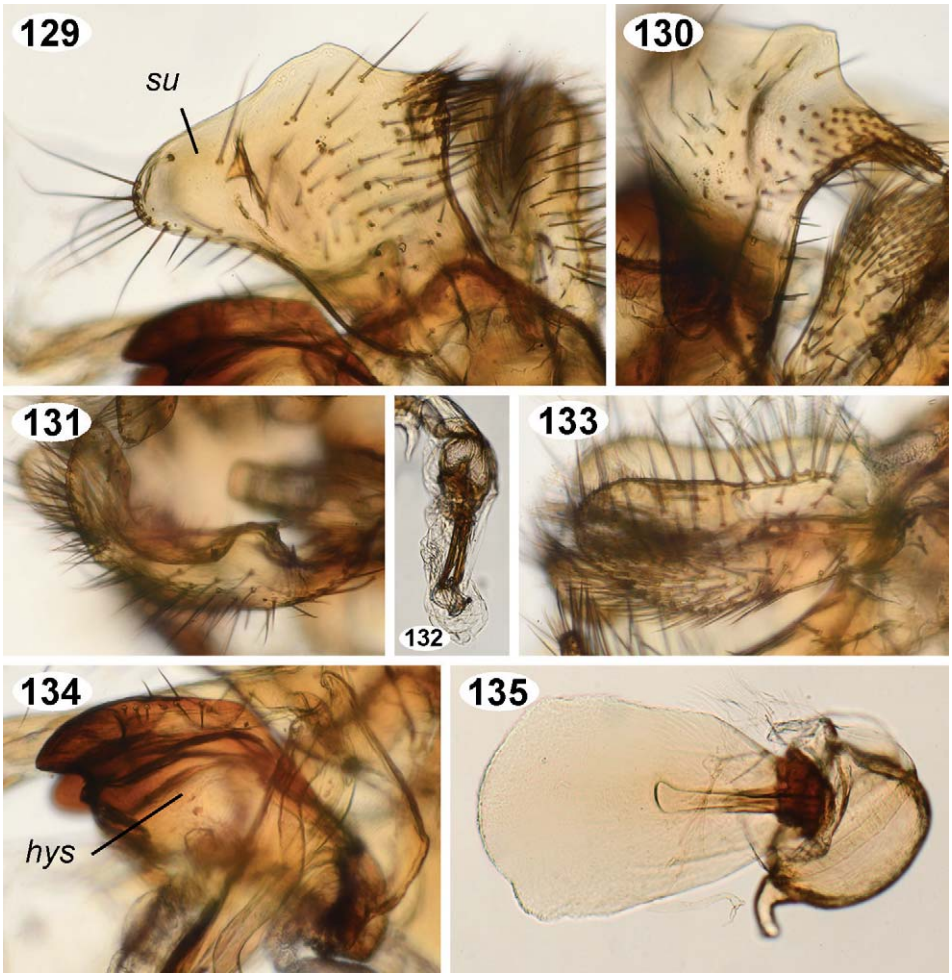


Figs 125–128. *Stylogaster kenyensis* sp. n. (♂ holotype): (125) thorax, dorsal view; (126) antenna, lateral view; (127) frons; (128) wing. Not to scale.

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Legs: Fore and mid legs yellow-brown. Hind leg darker, with brown base and dorsal surface of hind femur, a yellow-white subapical area on hind tibia and conspicuous black hind tarsi. Legs mainly with black or brown setulae and black setae, only fore leg additionally with pale yellow setulae. Fore coxa with 1, mid and hind coxae with 2 distinct black setae. Hind coxa with strong black setulae distally on anterior surface. Hind trochanter without teeth or dense setulae. Mid femur with row of regularly-arranged black setulae posteriorly on basal half. Hind tibia with 1–2 short black spines on the anterior surface. Claws dark brown basally, black distally. Pulvilli white. Empodia short, brown.

Abdomen: Mainly orange-brown, tergite 1 entirely brown, tergites 2–4 with brown posterior margins and brown fascia medially, tergite 5 with brown fascia medially and



Figs 129–135. Terminalia (♂) of *Stylogaster kenyensis* sp. n. (♂ holotype): (129) surstylus, lateral view; (130) same, dorsolateral view; (131) same, ventral view; (132) distiphallus; (133) cercus, lateral view; (134) phallus sheath of hypandrium, lateral view; (135) sperm pump and ejaculatory apodeme. Abbreviations: *hys* – phallus sheath of hypandrium; *su* – surstylus. Not to scale.

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tergite 6 brown with exception of lateral margins. Tergites with semi-adpressed black setulae. Tergite 1 with long black setulae laterally, tergite 2 with 1 or 2 black setae laterally on either side of anterior margin. Terminalia as illustrated in Figs 129–135. Cercus elongated (Fig. 133). Dorsal margin slightly concave. Cercus without lappet ventrally. No conspicuous teeth ventrally. No black setae. Surstylus without black teeth or conspicuous black setae (Fig. 129). A few scattered setulae on inner surface. Some long and strong setulae distally. Phallus sheath as illustrated in Fig. 134.

Female. Unknown.

Holotype: ♂ KENYA: (1) "KENYA / Western. Prov. / Kakamega Forest / 0°14.13'N, 34°51.87'E / 14. VII.2000 Malaise / trap, R. Copeland"; (2) "Holotypus / *Stylogaster* / *kenyensis* ♂ / des. Stuke, 2011" (NMKE). Right fore tarsi, left haltere and some setae damaged, right wing entirely destroyed. Abdomen dissected, macerated and deposited in glycerine in microvial pinned beneath specimen, holotype otherwise in reasonable condition.

Distribution: Known only from Kakamega Forest in western Kenya.

Bionomics: Sampled from Kenyan last remnant of the ancient Pan-African forest.

Stylogaster kirkspriggsi sp. n.

Figs 136–150

Etymology: The species is named in honour of Ashley H. Kirk-Spriggs (Bloemfontein), who provided numerous conopids used in this study.

Diagnosis: The male of this species is easily recognised by the diagnostic setulae on the mid tibia (Fig. 141). The only other Afrotropical *Stylogaster* species with a small ocellar triangle (Fig. 140) and similar habitus is *S. complexa* (Bigot). The male terminalia of *S. kirkspriggsi* sp. n. are (further) diagnostic (Figs 144–150).

Description (based on holotype):

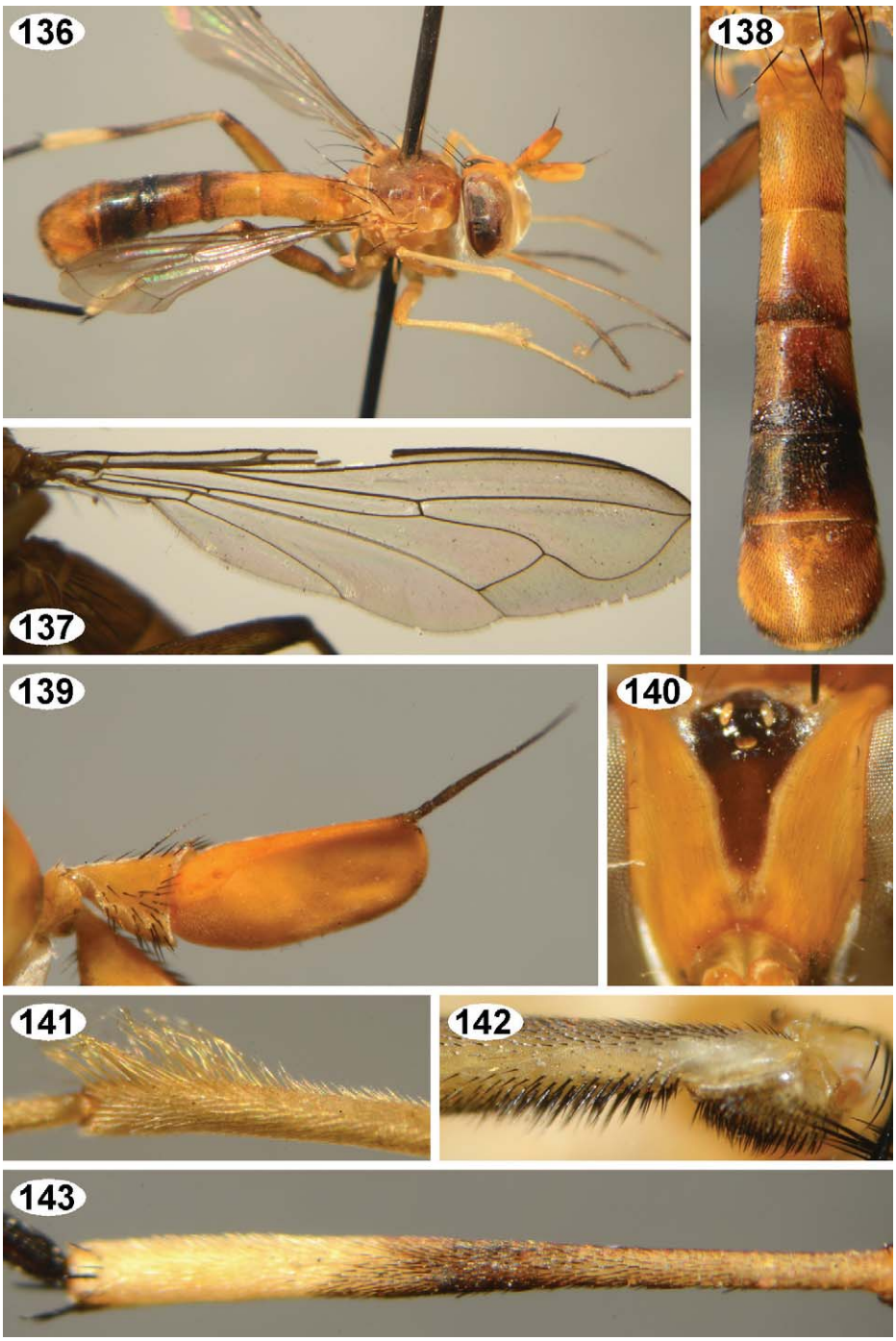
Male.

Overall length: *ca* 10.3 mm.

Head: 2.1 mm high. Eye dark brown, with a few scattered inconspicuous ommatrichia. Facets on inner side slightly enlarged. Ocelli yellow-brown. Ocellar tubercle blackish brown, with 1 pair of inconspicuous ocellar setae. Ocellar triangle triangular occupying less than half of frons, not reaching antennae (Fig. 140). Ocellar triangle blackish brown. Frons orange-brown lateral to ocellar triangle, with 2 or 3 fronto-orbital setae. Antenna orange-brown. Arista dark brown, 3 segments evident, situated dorsally at apex of basal flagellomere (Fig. 139). Scapus with few black setulae dorsally. Pedicellus with black setulae. Shape of antenna as illustrated in Fig. 139. One distinct black vertical seta. Face pale yellow with silver pruinosity. Occiput black to brown, distinctly silver pruinose; with row of regularly-arranged small white setulae dorsally, and several longer white setulae ventrally. Some long white setulae on mouth opening. Proboscis pale brown basally, becoming blackish brown distally, except for yellow-brown distal division of labellum. Labrum *ca* 6.6 mm, labellum approximately same length.

Thorax: Yellow-brown, mesoscutum pale brown medially. Setae black, with exception of golden setae on propleuron. Two notopleural setae, 1 supra-alar seta, 2 postalar setae, 1 praescutellar dorsocentral seta, 1 apical scutellar seta, 1 seta on anepimeron and 1 golden seta above fore coxa on propleuron. Black semi-adpressed setulae on mesoscutum.

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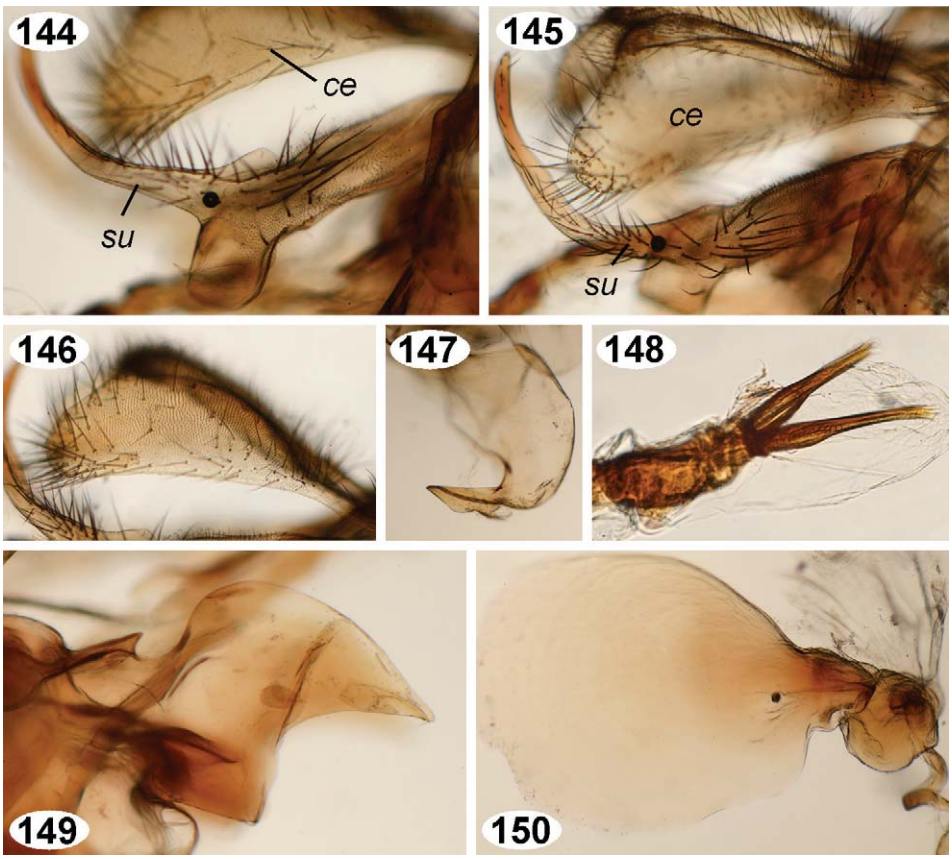


Figs 136–143. *Stylogaster kirkspriggsi* sp. n. (♂ holotype): (136) habitus, lateral view; (137) wing; (138) abdomen, dorsal view; (139) same, lateral view; (140) frons, dorsal view; (141) mid tibia, anterior view; (142) hind coxa and hind femur, ventral view; (143) hind tibia. Not to scale.

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Wing: Length 7.1 mm. Generally clothed in microtrichia, except for base of *sc*, base of r_{2+3}, most of *br*, base of r_{4+5}, *bm*, base of *dm* and *cup*. Hind margin of wing with black setulae. Venation as in Fig. 137. Haltere uniformly orange-brown, with areas of sensillae basally.

Legs: Fore and mid legs whitish yellow, hind leg slightly darker with brown band on apex of femur, a brown band in middle of tibia and contrasting white area on distal third of tibia. Fore and mid legs with white setulae, a few scattered black setulae, and black and golden setae, hind leg with black and white setulae, and black setae. Fore and mid coxae each with single long seta, seta on left of fore coxa golden, other three black. Fore and mid coxa additionally with some black or golden setulae. Hind coxa with strong black setae on anterior surface distally and 1 smaller black seta laterally. Additionally with several black or golden setulae. Fore and mid trochanter both with 1 conspicuous black or golden seta. Hind trochanter with conspicuous dense black setulae. Mid femur with row of regularly-arranged black setulae posteriorly in distal half. Mid tibia with long golden setulae on anterior and ventral surfaces distally (Fig. 141). Base



Figs 144–150. Terminalia (♂) of *Stylogaster kirkspriggsi* sp. n. (paratype): (144) surstylus, lateral view; (145) same, dorsolateral view; (146) cercus, lateral view; (147) hemispherical extension of hypandrium; (148) distiphallus; (149) phallus sheath of hypandrium, lateral view; (150) sperm pump and ejaculatory apodeme. Abbreviations: *ce* – cercus; *su* – surstylus. Not to scale.

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of hind femur with dense black setulae on posterior surface, slightly longer than other setulae on hind femur (Fig. 142). Claws only narrowly brown basally, black distally. Pulvilli brown. Empodia short, pale brown.

Abdomen: Uniformly orange-brown, tergites 4–5 with black discoloration (Fig. 138). Tergites with semi-adpressed black setulae. Tergite 1 with long golden setulae laterally, tergite 2 with 8 or 9 black lateral setae on either side of anterior margin, tergite 5 with long black setulae laterally. The abdomen of the holotype has not been dissected but matches, as far as can be seen, with the terminalia of a paratype. Terminalia as illustrated in Figs 144–150. Cercus elongated with a convex dorsal margin (Fig. 146). No conspicuous teeth ventrally. No black setae. Surstylus elongated and narrow with a conspicuous lobe basally (Fig. 144). No black spines or teeth. Phallus sheath as illustrated in Fig. 149, with a pointed apex and no black setae.

Female. Unknown.

Holotype: ♂ SOUTH AFRICA: (1) "CAPE PROVINCE / Cold spring / Grahamstown / 19.XI.1972 / C. Jacot-Guillarmod"; (2) "Holotypus / *Stylogaster* / *kirkspriggsi* ♂ / des. Stuke, 2009" (AMGS). Holotype complete and in good condition, except for some slight damage to right wing.

Paratypes: SOUTH AFRICA: *Eastern Cape*: 1♂ Belmont Valley, Grahamstown, 14–20.xii.1971, F.W. Gess (AMGS); 1♂ Howison's Poort, Grahamstown, 12–14.xi.1971, F.W. Gess (J-HS).

Distribution: Known only from the environs of Grahamstown in the Eastern Cape province of South Africa.

Bionomics: Unknown.

Stylogaster kroeberi sp. n.

Figs 151–162, 181

Etymology: This species is named in honour of the late Otto Kröber (1882–1969). He was a German dipterist, whose contribution to the study of Conopidae, especially the Afrotropical species, was considerable.

Diagnosis: *Stylogaster kroeberi* sp. n. belongs to a species-group with darkened posterior margins to the tergites (Fig. 153) and a white-setulose area on the distal part of the hind tibia (Fig. 155). It differs from the two other species in this group (*S. rinhaii* sp. n. and *S. malgachensis* Camras) in the presence of the small orange-brown ocellar triangle bordered by the orange-brown frons (Fig. 156), and in having only slightly enlarged eye facets (Fig. 181). The ♂ terminalia (Figs 157–162) are also diagnostic.

Description (based on holotype):

Male.

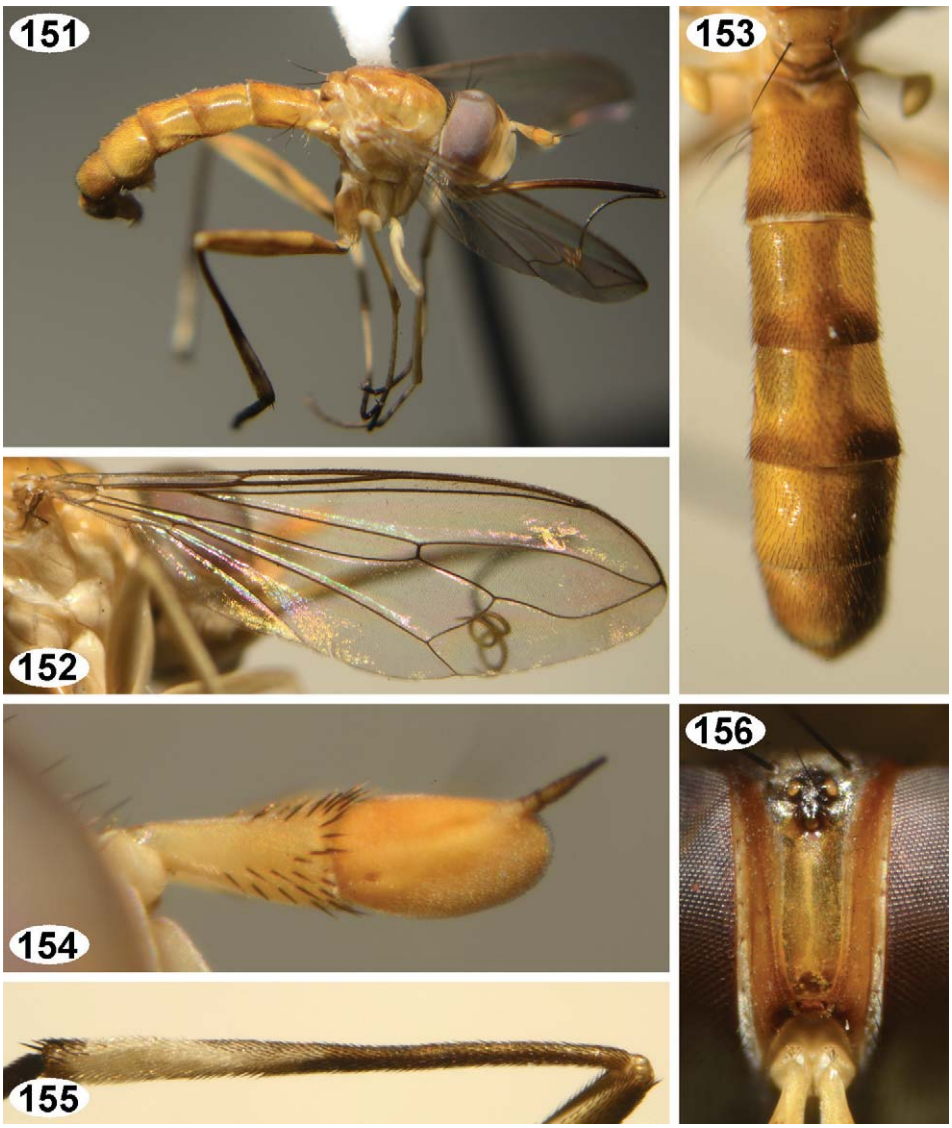
Overall length: *ca* 7.1 mm.

Head: 1.5 mm high. Eye dark brown, with a few scattered inconspicuous ommatrichia. Facets on inner side slightly enlarged. Ocelli orange-brown. Ocellar tubercle blackish brown, with 1 pair of ocellar setae. Ocellar triangle occupies virtually entire frons, reaching as far as antennae (Fig. 156). Ocellar triangle yellow-brown. Frons orange-brown lateral to ocellar triangle, with 4 fronto-orbital setae. Scapus and pedicellus yellow-brown, basal flagellomere orange-brown. Arista dark brown, base of 3 evident segments orange-brown, situated dorsally at apex of basal flagellomere (Fig. 154). Scapus with few black setulae dorsally. Pedicellus with black setulae. Shape of antenna

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as illustrated in Fig. 154. One distinct black vertical seta. Face pale yellow with silver pruinosity. Occiput black to brown, distinctly silver pruinose; with row of regularly-arranged small white setulae dorsally, and several longer white setulae ventrally. Some long white setulae on mouth opening. Proboscis pale brown basally, becoming blackish brown distally, except for yellow-brown distal division of labellum. Labrum *ca* 2.9 mm, labellum approximately same length.

Thorax: Yellow-brown, mesoscutum pale brown medially. All discernible setae black, with exception of golden seta on anepimeron. Two notopleural setae (1 damaged at right



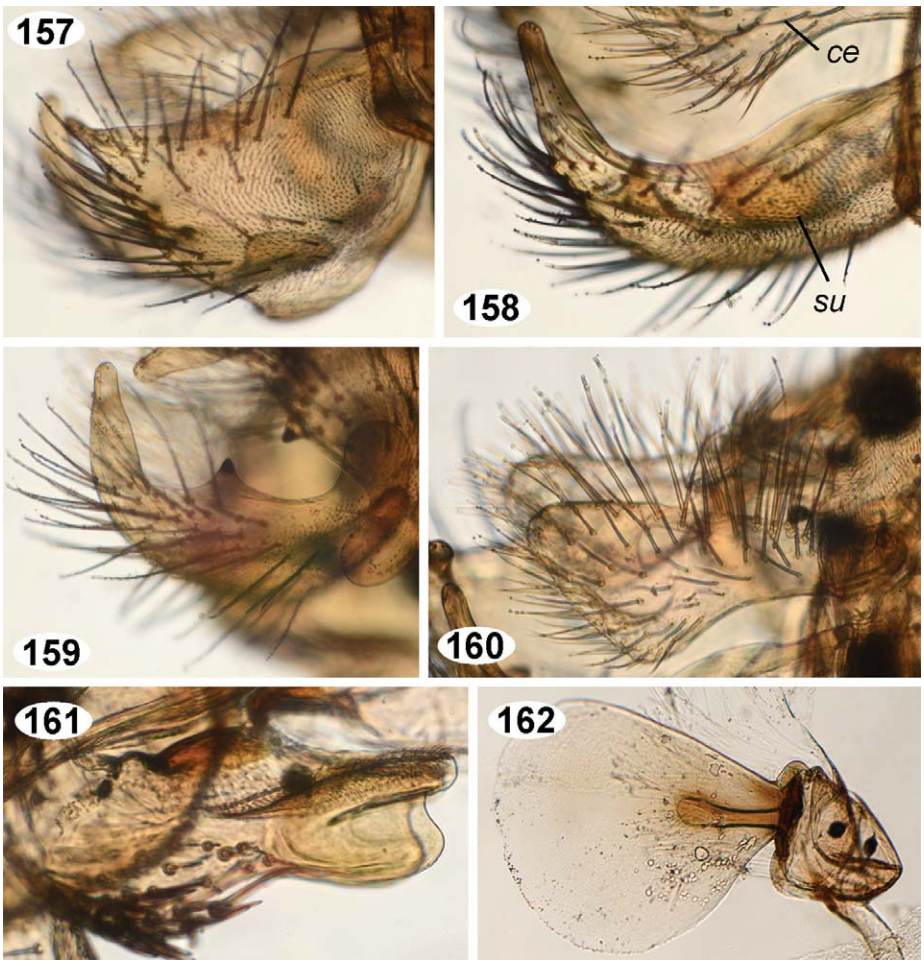
Figs 151–156. *Stylogaster kroeberi* sp. n. (♂ holotype): (151) habitus, lateral view; (152) wing; (153) abdomen, dorsal view; (154) same, lateral view; (155) hind tibia; (156) frons. Not to scale.

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side), 1 damaged supra-alar seta, 2 damaged postalar setae, 1 damaged praescutellar dorsocentral seta, 1 apical scutellar seta, 1 seta on anepimeron and 1 seta above fore coxa on propleuron. Black semi-adpressed setulae on mesoscutum.

Wing: Length 4.9 mm. Generally clothed in microtrichia, but base of *sc*, base of r_1, r_{2+3} and r_{4+5}, part of *br*, *bm*, base of *dm* and *cup* without microtrichia. Hind margin of wing with black or brown setulae. Venation as in Fig. 152. Haltere uniformly yellow-brown, with areas of sensillae at base.

Legs: Pale yellow, hind femur brown basally, with brown areas on hind tibia, a conspicuous white distal area on hind tibia and conspicuously black hind tarsi. Legs with white and black setulae and golden setae; only left hind coxa with black setae. Fore and mid coxae without distinct setae, but with strong golden setulae distally. Hind coxa with strong golden setulae distally on anterior surface, laterally with smaller golden setulae,



Figs 157–162. Terminalia (♂) of *Stylogaster kroeberi* sp. n. (holotype): (157) surstylus, lateral view; (158) same, dorsolateral view; (159) same, ventral view; (160) cercus, lateral view; (161) phallus sheath of hypandrium, lateral view; (162) hemispherical extension of hypandrium. Abbreviations: *ce* – cercus; *su* – surstylus. Not to scale.

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without outstanding lateral seta. Hind trochanter without teeth, but with dense golden setulae. Mid femur with row of regularly-arranged golden setulae along entire length posteriorly. Hind tibia with single short black spines on anterior surface. Claws brown basally, black distally. Pulvilli brown. Empodia short, brown.

Abdomen: Mainly orange-brown, tergites 2–5 with indistinct darker posterior margins, tergite 6 pale brown (Fig. 153). Tergites with semi-adpressed black setulae. Tergite 1 with long golden setulae laterally, tergite 2 with 5 black lateral setae on either side at anterior margin. Terminalia as illustrated in Figs 157–162. Cercus triangular (Fig. 160). Dorsal margin straight. Cercus with lappet ventrally. No conspicuous teeth ventrally. No black setae. Surstylus with 1 black tooth medially on distal margin (Fig. 159). No setulae on inner surface. Phallus sheath as illustrated in Fig. 161. Strong black setulae conspicuous basally.

Female. Unknown.

Holotype: ♂ MADAGASCAR: (1) "Madagascar, Toliana Prov. / Fiheren, 5.-10. VII.2003, / 23°13.351'S 43°52.853'E / elev 65m, coll. Cal. Acad. of Sci. / ex: malaise trap MGF076"; (2) "CASLOT 044926"; (3) "Holotypus / *Stylogaster* / *kroeberi* ♂ / des. Stuke, 2011" (CAS). Some tarsi and setae damaged. Abdomen dissected, macerated and deposited in glycerine in a microvial pinned beneath specimen, holotype otherwise in good condition.

Distribution: Endemic to Madagascar.

Bionomics: Sampled in primary rainforest at low elevation (65 m).

Stylogaster latifrons sp. n.

Figs 163–172

Etymology: From the Latin *latus* (broad) and *frons* (forehead), a significant character of the new species being the broad frons with vertical setae close to the eye margin.

Diagnosis: *Stylogaster latifrons* sp. n. has a broad frons, the distance of the vertical seta to lateral ocellus being greater than the distance between the lateral ocelli (Fig. 166); occiput with only 3 long white setulae ventrally, and mouth opening with 5 or 6 short black setulae. The terminalia are diagnostic, with some long setulae distally on cercus (Fig. 171).

Description (based on holotype):

Male.

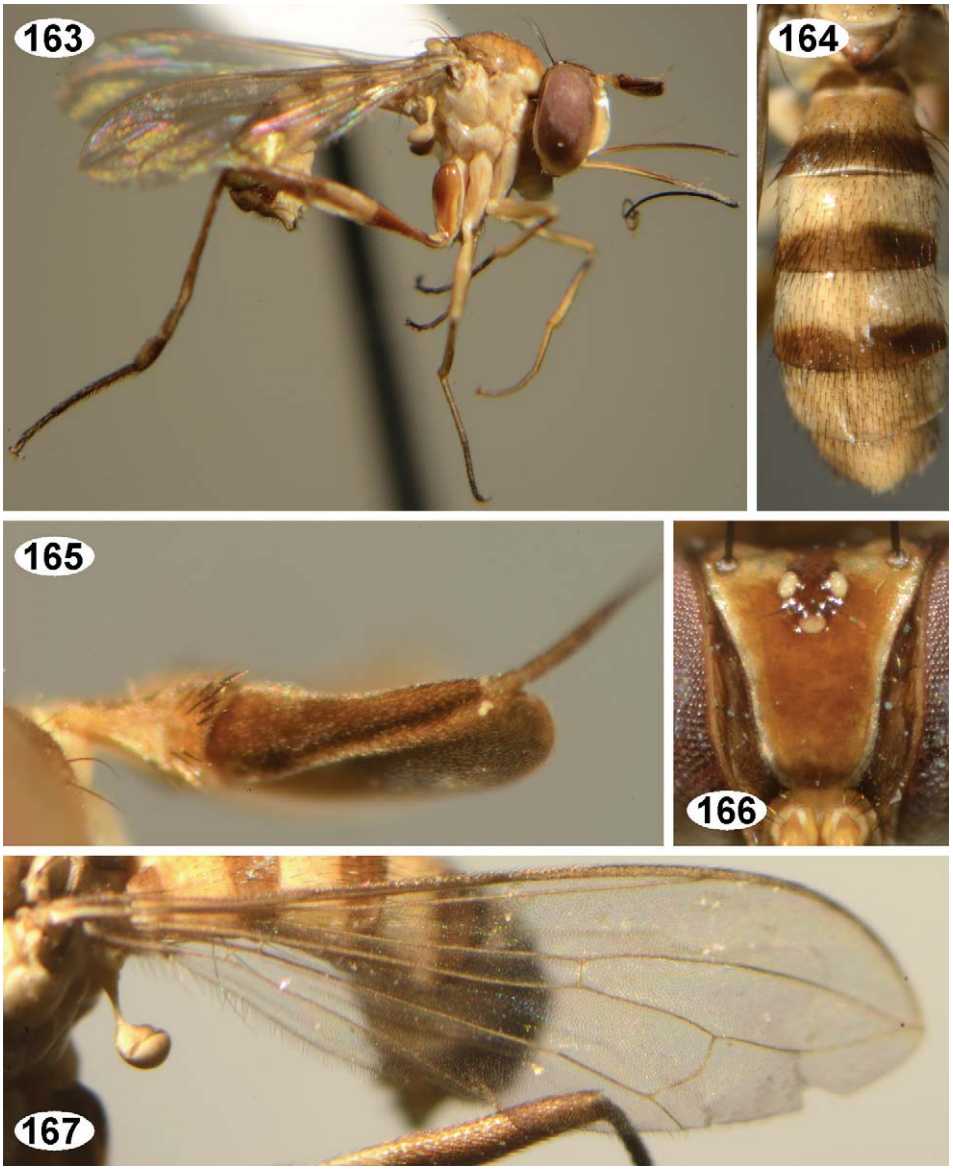
Overall length *ca* 4.7 mm.

Head: 1.3 mm high. Eye red-brown, with a few scattered inconspicuous ommatrichia. Facets on inner side slightly enlarged. Ocelli pale yellow. Ocellar tubercle brown, with 1 pair of ocellar setae. Ocellar triangle occupies virtually entire frons, reaching as far as antennae (Fig. 166). Ocellar triangle brown. Frons brown lateral to ocellar triangle, with 2 discernible small fronto-orbital setae. Antenna yellow, basal flagellomere brown distally and dorsally. Arista brown, 3 segments evident. Arista situated dorsally at apex of basal flagellomere (Fig. 165). Scapus with few black setulae dorsally. Pedicellus with black setulae. Shape of antenna as illustrated in Fig. 165. One vertical seta positioned close to eye (Fig. 166). Face pale yellow with silver pruinosity. Occiput blackish brown, distinctly silver pruinose; with row of regularly-arranged small white setulae, and three long white setulae ventrally. Five or six short, black setulae on mouth opening. Proboscis

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pale yellow basally, becoming black distally, except for yellow-brown distal division of labellum. Labrum *ca* 1.9 mm, labellum approximately same length.

Thorax: Yellow-white; mesoscutum (with exception of postpronotum and postalar calli), scutellum and triangular area of mediotergite brown. All setae black. Two notopleural setae, 1 supra-alar seta (1 damaged), 2 postalar setae (1 damaged), 1 praescutellar dorsocentral seta (1 damaged), 1 apical scutellar seta (2 damaged), 1 seta on anepimeron (2



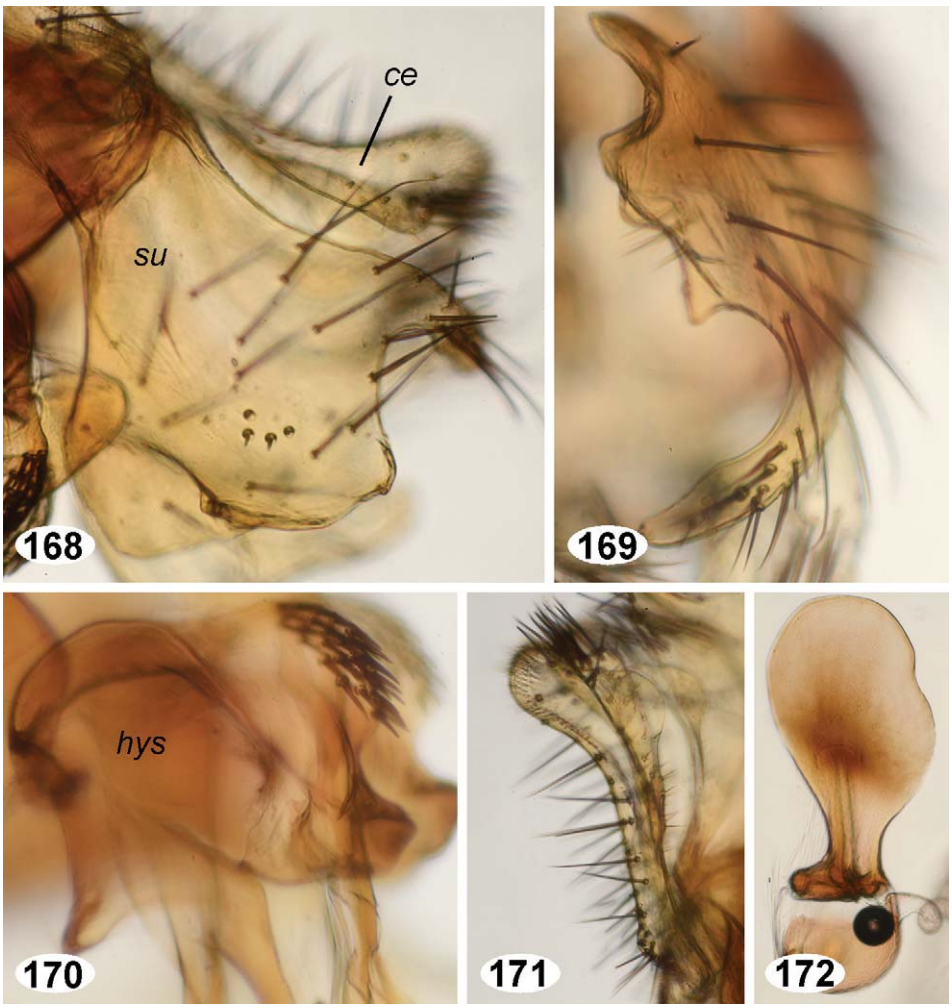
Figs 163–167. *Stylogaster latifrons* sp. n. (♂ holotype): (163) habitus, lateral view; (164) abdomen, dorsal view; (165) antenna, lateral view; (166) frons; (167) wing. Not to scale.

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damaged) and 1 seta above fore coxa on propleuron (1 damaged). A few black setulae on anepimeron. Black semi-adpressed setulae on mesoscutum partly arranged in rows and forming medial row of denser setulae.

Wing: Length 4.6 mm. Generally clothed in microtrichia, but *bm* and partly *cup* without microtrichia. Hind margin of wing with black or brown setulae. Venation as in Fig. 167. Haltere uniformly pale yellow, with areas of sensillae at base. Fore and mid leg pale yellow-white. Hind leg brown with pale area medially on hind femur and hind tibia with yellow-white subapical area.

Legs: Mainly with black or brown setulae, only fore and mid tibiae with pale yellow setulae. All setae black. Fore coxa with 2 distinct setae and several black setulae. Mid



Figs 168–172. Terminalia (♂) of *Stylogaster latifrons* sp. n. (holotype): (168) surstylus, lateral view; (169) same, ventral view; (170) phallus sheath of hypandrium, lateral view; (171) cercus, lateral view; (172) sperm pump and ejaculatory apodeme. Abbreviations: *ce* – cercus; *hys* – phallus sheath of hypandrium; *su* – surstylus. Not to scale.

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coxa with 1 black seta and additional black setulae. Hind coxa with 1 lateral black seta and with strong black setulae distally on anterior surface. Hind trochanter without teeth or dense setulae. Mid femur with a row of regularly-arranged, black setulae posteriorly in basal half. Hind tibia with 4 short, black spines on anterior surface. Claws dark brown basally, distally black. Pulvilli brown. Empodia short, brown.

Abdomen: Mainly pale brown, tergite 1 dark brown, tergites 2–4 with dark brown hind margin, tergite 6 dark brown laterally (Fig. 164). Tergites with semi-adpressed black setulae. Tergite 1 with long black setulae laterally, tergite 2 with 3 black lateral setae on either side of anterior margin. Terminalia as illustrated in Figs 168–172. Cercus triangular (Fig. 171). Dorsal margin concave. Some conspicuous long setulae distally (Fig. 171). Cercus with small inconspicuous lappet ventrally. No black setae. Surstylus without black teeth. No setulae on inner surface. Phallus sheath as illustrated in Fig. 170. Black setae basally and slightly darkened apex conspicuous.

Female. Unknown.

Holotype: ♂ MADAGASCAR: (1) "Madagascar: Province / Fianarantsoa, Parc National / Ranomafana, radio tower / at forest edge, elev. 1130 m / 8. Aug. - 23. Sept.2004 / 21°15.05'S 47°24.43'E"; (2) "coll: M. Irwin, R. Harin'Hala / California Acad of Sciences / malaise, mixed tropical / forest MA-02-09B-98"; (3) "Holotypus / *Stylogaster* / *latifrons* ♂ / des. Stuke, 2011" (CAS). Right hind leg and left arista damaged. Abdomen dissected, macerated and deposited in glycerine in a microvial pinned beneath specimen, holotype is otherwise in good condition.

Distribution: Endemic to Madagascar.

Bionomics: Sampled in primary rainforest at moderately high elevation (1130 m).

Stylogaster malgachensis Camras, 1962

Figs 173–180

Stylogaster malgachensis Camras, 1962*b*: 185 (Type locality: Madagascar: "Ankarafantsika Forest, Tsaramandroso").

Literature: Camras (1962*b*), Smith (1967).

Material examined: MADAGASCAR: *Antananarivo*: 1♀ Province, 46 km NE of Ankazobe, Ambohitantely, 18°11.88'S 47°16.89'E, 700 m, 15.x–1.xi.2004, sclerophyl forest, M. Irwin & R. Harin'Hala, Malaise trap; 1♂ same data, except 1–14.xi.2004. *d'Antsiranana*: 1♀ Parc National Montagne d'Ambre, 12°30.87'S 49°10.88'E, 960 m, 7–27.i.2007, M. Irwin, F. Parker & R. Harin'Hala, Malaise trap (all CAS & J-HS).

Remarks: The females identified here as *S. malgachensis* match the original description as well as to the description of Smith (1967). The male is identified as *S. malgachensis* due to diagnostically enlarged facets (Fig. 180).

Distribution: Endemic to Madagascar.

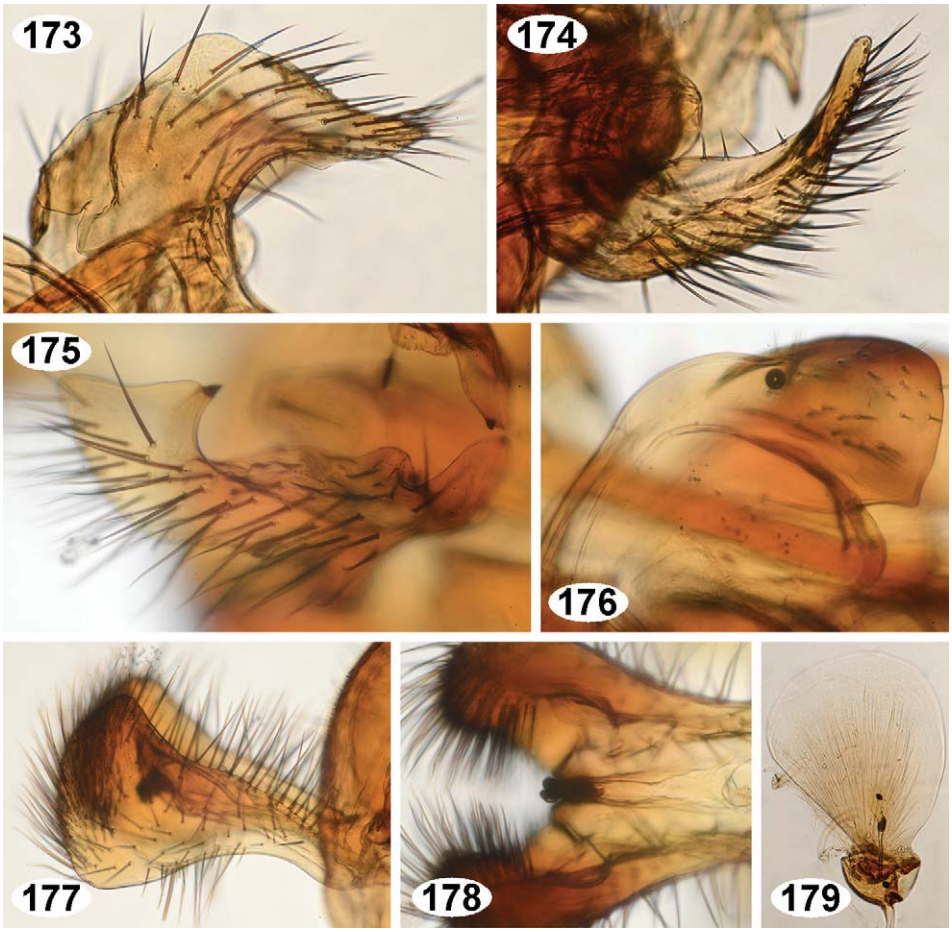
Bionomics: Found in sclerophyl forest at low to moderately high elevation (700–960 m).

Stylogaster nitens Brunetti, 1925

Stylogaster nitens Brunetti, 1925: 111, 112 (Type locality: Ghana: "Obuasi Ashanti").
Stylogaster parva Camras, 1955: 121, 122 (Type locality: "Uganda: Kawanda").
Stylogaster nitidula Kröber, 1936: 262, 263 (Type locality: Democratic Republic of the Congo: "Elisabethville").

Material examined: ANGOLA: 1♂ 7 miles W Gabela, 16–18.iii.1972 (BMNH). DEMOCRATIC REPUBLIC OF THE CONGO: 1♂ Miss H. De Saeger, II/gd/11, 23.vi.1951, Réc. J. Verschuren. 1969; 1♂ Miss H. De Saeger, II/ed/9, 22.vi.1951, Réc. J. Verschuren. 1968; 1♂ Miss H. De Saeger, II/le/8, 9.ix.1952, H. De Saeger. 4040; 1♂ Miss H. De Saeger, II/fd/18, 26.vi.1951, Réc. H. De Saeger. 1981 (all MRAC). SOUTH AFRICA: *KwaZulu-Natal*: 1♂ Ngoye forest between Eshowe & Empangeni, ii.1957, B.R. Stuckenberg (NMSA).

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Figs 173–179. Male postabdomen of *Stylogaster malgachensis* Camras (♂ Madagascar, 46 km NE of Ankazobe): (173) surstylus, lateral view; (174) same, dorsal view; (175) same, ventral view; (176) phallus sheath of hypandrium, lateral view; (177) cercus, lateral view; (178) cercus, ventral view; (179) sperm pump and ejaculatory apodeme. Not to scale.

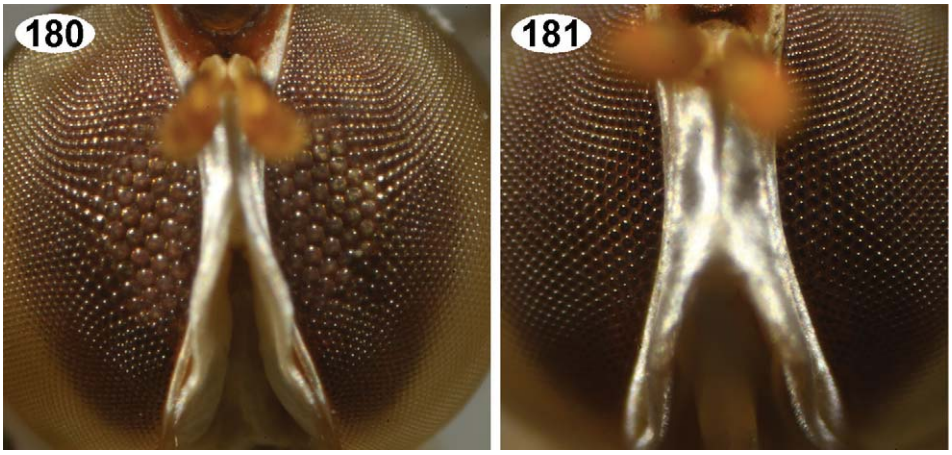
Distribution: Widely distributed in the Afrotropical Region. Records from Madagascar (as *S. parva*) cannot be confirmed and may represent the very similar *S. camrasi*. Recently confirmed records of males are from Angola, Democratic Republic of the Congo, Ghana, South Africa and Uganda. Records based on egg records from hosts, on females, or on males without investigation of the male terminalia, remain of uncertain validity because of the presence of several similiar species not recognised previously.

Stylogaster parkeri sp. n.

Figs 182–185

Etymology: The species is named in honour of Frank D. Parker (Logan, Utah), who spent considerable time working on "An Arthropod Survey of Madagascar's Protected Areas (1998–2009)", which yielded numerous conopids used in this study.

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Figs 180, 181. Enlarged facets of *Stylogaster* spp.: (180) *S. malgachensis* Camras (♂ Madagascar, 46 km NE of Ankazobe); (181) *S. kroeberi* sp. n. (holotype). Not to scale.

Diagnosis: *Stylogaster parkeri* sp. n. belongs to a group of similar *Stylogaster* spp. occurring on Madagascar, that are only separable by reference to the male terminalia. The surstylus of *S. parkeri* sp. n. has conspicuous strong, black setulae on the inner surface (Fig. 188), no black teeth and strong black setae on the base of the phallus sheath of the hypandrium (Fig. 189). The only other species with this combination of characters is *S. rinhaii* sp. n., which has a white setulose area on the hind tibia.

Description (based on holotype):

Male.

Overall length: *ca* 7.7 mm.

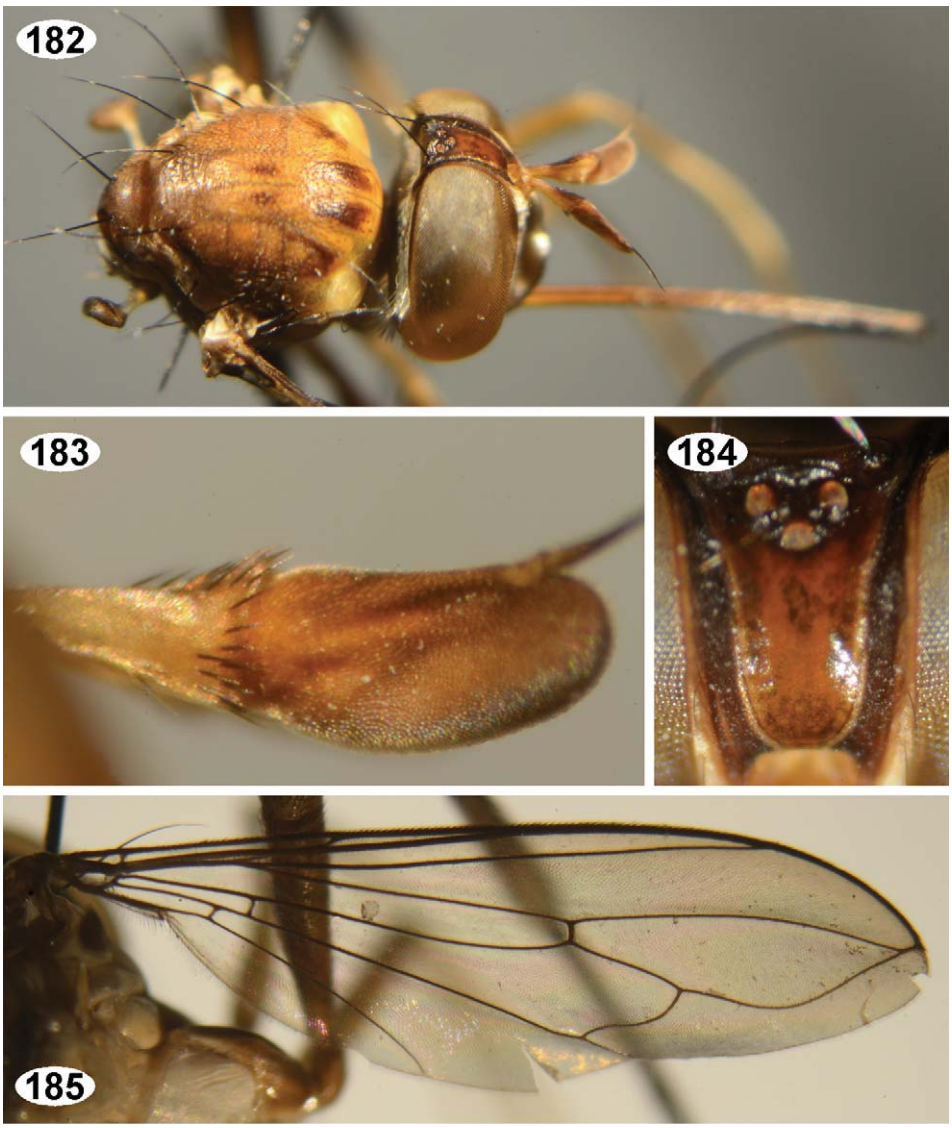
Head: 1.9 mm high. Eye brown, with a few scattered, inconspicuous ommatrichia. Facets on inner side slightly enlarged. Ocelli orange-brown. Ocellar tubercle blackish brown, with 1 pair of ocellar setae (1 damaged). Ocellar triangle occupies virtually entire frons, reaching as far as antennae (Fig. 184). Ocellar triangle brown. Frons black lateral to ocellar triangle with 2 or 3 defined fronto-orbital setae. Scapus and pedicellus yellow-brown, basal flagellomere pale brown. Arista brown basally, becoming black distally, 2 segments evident, situated dorsally at apex of basal flagellomere (Fig. 183). Scapus dorsally with few black setulae. Pedicellus with black setulae. Shape of antenna as illustrated in Fig. 183. One distinct black vertical seta. Face pale yellow with silver pruinosity. Occiput pale brown, distinctly silver pruinose; with a row of regularly-arranged small white setulae dorsally, and several longer white setulae ventrally. Some long white setulae on mouth opening. Proboscis yellow-brown basally, becoming dark brown distally, except for yellow-brown distal division of labellum. Labrum *ca* 3.7 mm, labellum approximately same length.

Thorax: Yellow-white; mesoscutum (with exception of postpronotum and postalar calli), scutellum, mediotergite and small macula on posterior margin of anepisternum brown. All setae black with exception of golden seta on propleuron. Two notopleural setae, 1 supra-alar seta, 2 postalar setae (1 damaged), 1 praescutellar dorsocentral seta, 1 apical

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scutellar seta, 1 seta on anepimeron and 1 seta above fore coxa on propleuron. A few black setulae on anepimeron. Black semi-adpressed setulae on mesoscutum.

Wing: Length 5.8 mm. Generally clothed in microtrichia, except for base of r_1 and r_{2+3}, part of *br*, *bm*, base of *dm*, *cup*, base of cua_1 and base of anal lobe without microtrichia. Hind margin of wing with black or brown setulae. Venation as in Fig. 185. Haltere uniformly pale yellow, knob brown, with areas of sensillae at base. Fore and mid leg pale yellow-white. Hind leg brown, hind tibia white distally, contrasting with black hind tarsi.

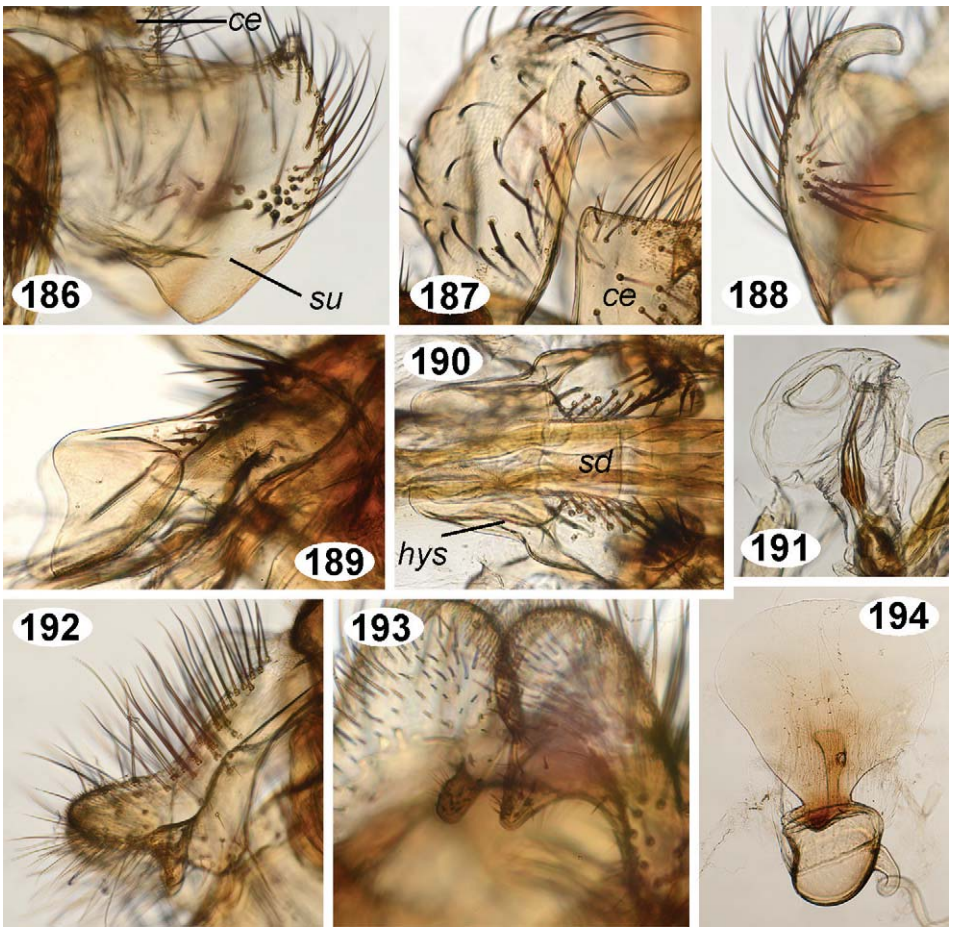


Figs 182–185. *Stylogaster parkeri* sp. n. (♂ holotype): (182) habitus, lateral view; (183) antenna, lateral view; (184) frons; (185) wing. Not to scale.

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Legs: Mainly with black or brown setulae, only fore and mid tibiae with pale yellow setulae. Setae on fore and mid coxae white, setae on hind coxa black. Fore and mid coxae without distinct setae, but with strong white setulae distally. Hind coxa with 1 lateral black seta and also distally on anterior surface with strong black setulae. Hind trochanter without teeth or dense setulae. Mid femur with a row of regularly-arranged black setulae posteriorly on basal half. Hind tibia with 4–7 short black spines on anterior surface. Claws dark brown basally, distally black. Pulvilli orange-brown. Empodia short, orange-brown.

Abdomen: Mainly pale yellow, tergites 2–4 with brown hind margin, tergite 6 and epandrium mainly brown. Only macerated abdomen available, so colouration difficult to describe. Tergites with semi-adpressed black setulae. Tergite 1 with long black and white setulae laterally, tergite 2 with 6 black lateral setae on either side of anterior margin.



Figs 186–194. Terminalia (♂) of *Stylogaster parkeri* sp. n. (holotype): (186) surstylus, lateral view; (187) same, dorsolateral view; (188) same, frontal view; (189) phallus sheath of hypandrium, lateral view; (190) same, ventral view; (191) distiphallus; (192) cercus, lateral view; (193) teeth at the ventral conjunction of cerci, ventral view; (194) sperm pump and ejaculatory apodeme. Abbreviations: *ce* – cercus; *hys* – phallus sheath of hypandrium; *sd* – sperm duct; *su* – surstylus. Not to scale.

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Terminalia as illustrated in Figs 186–194. Cercus triangular (Fig. 192). Dorsal margin concave. Cercus with long lappet ventrally. No conspicuous teeth ventrally. No black setae. Surstylus without black teeth. Strong black setulae on inner surface. Phallus sheath as illustrated in Figs 189, 190. Strong black setulae basally conspicuous.

Female. Unknown.

Holotype: ♂ MADAGASCAR: (1) "Madagascar, Fianarantsoa Prov., / 12 km W Ranomafana Natl Pk / entrance. radio tower, malaise in / montane tropical forest / 3.15.IV.2003 / R.H.'Hala, M.E. Irwin, 1215m / 21°15.05'S. 47°24.43'E. MG 9B-57"; (2) "Holotypus / *Stylogaster* / *parkeri* ♂ / des. Stuke, 2011" (CAS). Abdomen dissected, macerated and deposited in glycerine in a microvial pinned beneath specimen, holotype otherwise in good condition.

Distribution: Endemic to Madagascar.

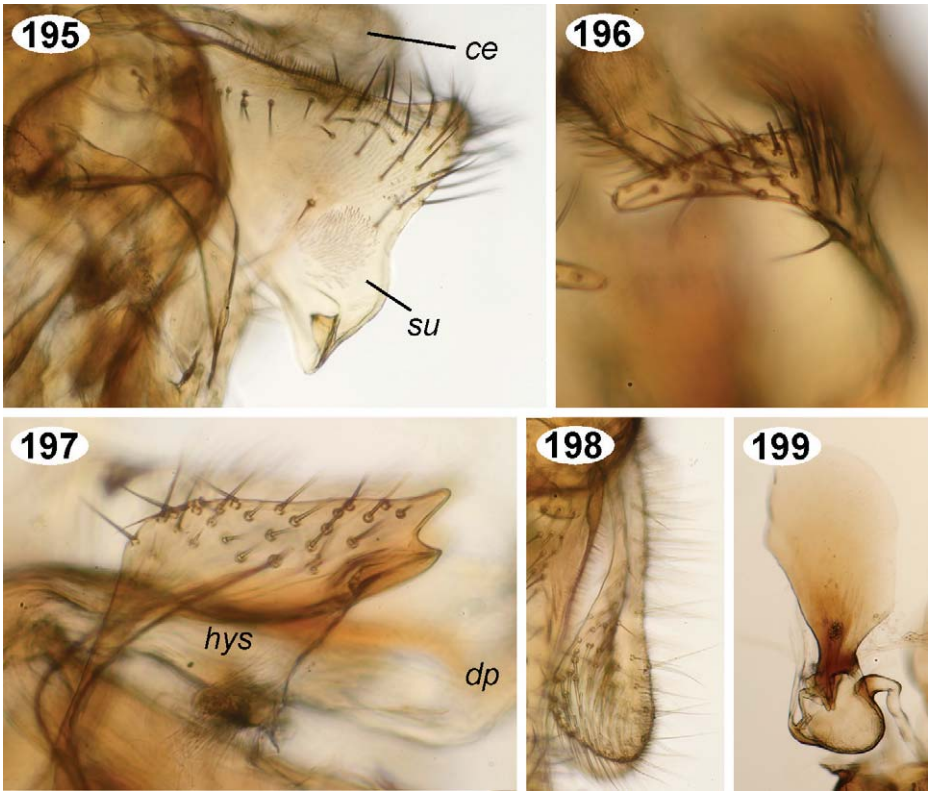
Bionomics: Sampled in primary rainforest at moderately high elevation (1215 m).

Stylogaster pauliana Camras, 1962

Figs 195–199

Stylogaster pauliana Camras, 1962*b*: 186 (Type locality: "Madagacar: Analavelona Mt.").

Literature: Camras (1962*b*), Smith (1967).



Figs 195–199. Terminalia (♂) of *Stylogaster pauliana* Camras (Madagascar, Tulear, Andohaela National Park): (195) surstylus, lateral view; (196) same, dorsal view; (197) phallus sheath of hypandrium, lateral view; (198) cercus, lateral view; (199) sperm pump and ejaculatory apodeme. Abbreviations: *ce* – cercus; *dp* – distiphallus; *hys* – phallus sheath of hypandrium; *su* – surstylus. Not to scale.

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Material examined: MADAGASCAR: *Antananarivo*: 1♀ 46 km NE of Ankazobe, Ambohitantely, 18°11.88'S 47°16.89'E, 700 m, 16–17.xii.2002, sclerophyl forest, M. Irwin & R. Harin'Hala, Malaise trap. *Tulear*: 1♂ 4 km NW Manombo, Mikea forest, dry deciduous forest, 22°54.22'S 43°28.53'E, 30 m, 20–27.xi.2001, M. Irwin & R. Harin'Hala, Malaise trap; 1♀ same, except 6–16.xii.2001; 1♀ same, except 13–23.vii.2002; 1♂ same, except 3–14.ix.2002; 1♂ same, except 14–23.ix.2002; 1♀ same, except 3–13.x.2002; 1♂ same, except 7–18.iv.2003; 1♂ same, except 3–10.viii.2003; 1♂ same, except 31.viii–11.ix.2003; 1♀ NW Manombo, Mikea forest, spiny forest, 22°54.80'S 43°28.93'E, 37 m, 12.x–12.xi.2001, M. Irwin & R. Harin'Hala, Malaise trap; 1♂ same, except 23.vii–6.viii.2002; 1♀ same, except 23–30.xi.2003; 2♂ Andohaela National Park, Parcel II, Tsimela, transitional forest, 24°56.21'S 46°37.60'E, 175 m, 16–17.xii.2002, M. Irwin, F.D. Parker & R. Harin'Hala, Malaise trap; 1♂ same, except 27.xii.2002–6.i.2003; 1♂ same, except 6–16.i.2003; 1♂ same, except 16–26.i.2003; 1♂ same, except 18–28.iii.2003; 2♂ same, except 29.vi–10.vii.2003; 1♂ same, except 10–21.ix.2003; 1♂ same, except 1–11.x.2003; 2♂ same, except 21–23.xii.2003; 1♀ same, except 28.i–12.ii.2004; 1♂ Andohaela National Park, Ihazofotsy, Parcelle III, dry spiny forest, 22°49.85'S 46°32.17'E, 80 m, 12–16.xii.2002, M. Irwin & R. Harin'Hala, Malaise trap; 1♂ same, except 15–26.i.2003; 1♀ same, except 3–13.ii.2003; 1♂ same, except 18–29.iii.2003; 3♂ same, except 11–22.vi.2003; 2♂ 1♀ same, except 3–13.ix.2003; 1♀ same, except 3–14.i.2004; 1♀ Zombitse National Park, near national road, deciduous spiny forest, 20°50.43'S 44°43.87'E, 825 m, 14–16.xii.2001, R. Harin'Hala, Malaise trap. *Fianarantsoa*: 1♂ 40 km S Ambositra, low altitude rainforest, 20°47.56'S 47°10.54'E, 825 m, 23.vii–6.viii.2002, M. Irwin & R. Harin'Hala, Malaise trap; 1♂ Majunga, Ambovomamy, Belambo, 20 km NW Port Berger, secondary growth on white sand, 15°27.07'S 47°36.80'E, 33 m, 25.ii–3.iii.2007, M. Irwin, F. Parker & R. Harin'Hala, Malaise trap; 1♂ same, except 10–18.iii.2007 (all CAS & J-HS).

Distribution: Endemic to Madagascar.

Stylogaster pseudofanjae sp. n.

Figs 200–210

Etymology: The species name refers to the similarity between *S. fanjae* sp. n.; both species were collected in the same locality on the same date.

Diagnosis: *Stylogaster pseudofanjae* sp. n. belongs to a group of similar species occurring on Madagascar, having a black mesoscutum (Fig. 200), a dark brown abdomen (Fig. 201) and no additional setulae on the mid femur. The three species in this group (*S. camrasi*, *S. fanjae* sp. n. and *S. pseudofanjae* sp. n.) can be easily distinguished by characters of the male terminalia. *Stylogaster pseudofanjae* sp. n. has two black teeth on the distal margin of the surstylus (Figs 205, 207), no black setae at the base of the phallus sheath (Fig. 208), strong black setulae on the cercus, and a diagnostic shape of the surstylus. It is very similar to *S. fanjae* sp. n., but the surstylus is differently shaped, especially in the ventral view (Fig. 68). Also, *S. pseudofanjae* sp. n. has no dense black setulae on the ventral surface of the mid tibia as does *S. fanjae* sp. n. (Fig. 65).

Description (based on holotype):

Male.

Overall length: *ca* 4.6 mm.

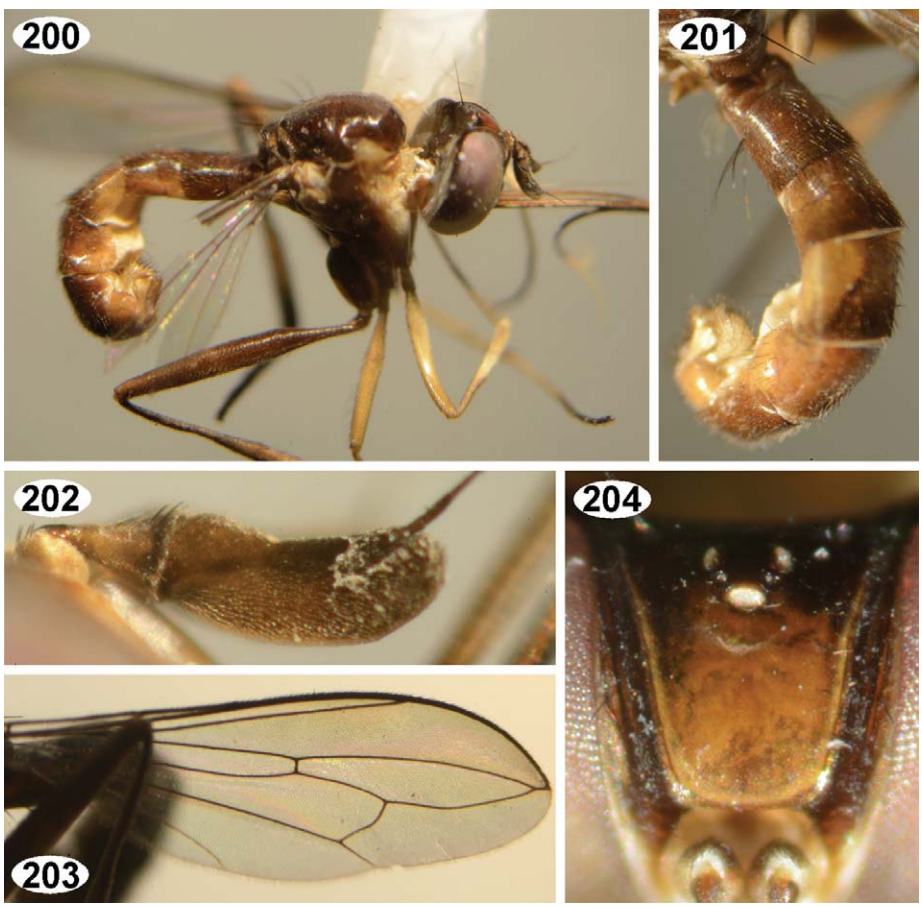
Head: 1.0 mm high. Eye dark brown, with a few scattered inconspicuous ommatrichia. Facets on inner side slightly enlarged. Ocelli orange-brown. Ocellar tubercle blackish brown, with 1 pair of damaged ocellar setae. Ocellar triangle occupies virtually entire frons, reaching as far as antennae (Fig. 204). Ocellar triangle brown. Frons black lateral to the ocellar triangle, with only 2 small, defined, fronto-orbital setae. Antenna dark brown. Arista dark brown, 3 segments evident. Arista situated dorsally at apex of basal flagellomere (Fig. 202). Scapus with a few orange-brown setulae dorsally. Pedicellus with black setulae. Shape of antenna as illustrated in Fig. 202. One distinct black vertical seta. Face pale yellow with silver pruinosity. Occiput black to brown, distinctly silver

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pruinose; with a row of regularly-arranged small white setulae dorsally, and several longer white setulae ventrally. Some long white setulae on mouth opening. Proboscis pale yellow basally, becoming dark brown distally, except for yellow-brown distal division of labellum. Labrum *ca* 2.0 mm, labellum approximately same length.

Thorax: Yellow-brown; mesoscutum (with exception of postpronotum), scutellum, mediotergite and laterotergite dark brown, anepisternum and katepisternum pale brown. All undamaged setae on holotype black (dorsocentral seta and seta on anepimeron missing, all other setae intact on one side of specimen), with exception of golden seta on propleuron. Two notopleural setae, 1 supra-alar seta, 2 postalar setae, 1 praescutellar dorsocentral seta, 1 apical scutellar seta, 1 seta on anepimeron and 1 seta above fore coxa on propleuron. Black semi-adpressed setulae on mesoscutum.

Wing: Length 3.7 mm. Generally clothed in microtrichia, but base of r_1 and very narrowly at base of r_{2+3}, most of *br*, *bm*, base of *dm*, base of anal lobe, base of *cup* and cua_1 without microtrichia. Hind margin of wing with black or brown setulae. Venation as in Fig. 203. Haltere uniformly pale brown, with areas of sensillae at base.



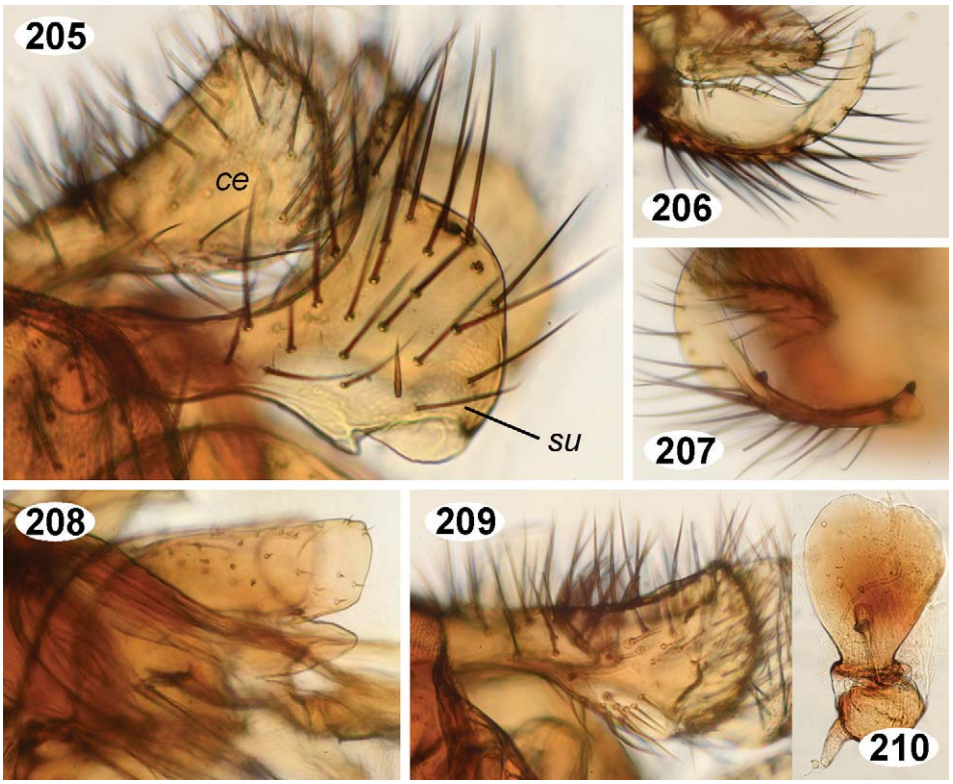
Figs 200–204. *Stylogaster pseudofanjae* sp. n. (♂ holotype): (200) habitus, lateral view; (201) abdomen, dorsolateral view; (202) antenna, lateral view; (203) wing; (204) frons. Not to scale.

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Legs: Fore and mid legs yellow-brown. Hind leg darker with paler ventral surface and medial part of hind femur. Legs mainly with black or brown setulae and black setae, only fore and mid tibiae additionally with pale yellow setulae. Fore and mid coxae without distinct setae, but with strong black setulae distally. Hind coxa without lateral black setulae, but with strong black setulae distally on anterior surface. Hind trochanter without teeth or dense setulae. Mid femur with a row of regularly-arranged black setulae on basal half posteriorly. Hind tibia with 1 short black spine on anterior surface. Claws dark brown basally, black distally. Pulvilli pale yellow. Empodia short, brown.

Abdomen: Mainly dark brown, tergites 2–4 paler brown laterally in basal two-thirds. Epandrium narrowly yellow laterally at base (Fig. 201). Tergites with semi-adpressed black setulae. Tergite 1 with long white setulae laterally, tergite 2 on anterior margin with 4–6 black lateral setae on either side. Terminalia as illustrated in Figs 205–210. Cercus elongated (Fig. 209). Dorsal margin slightly concave. Cercus without lappet ventrally. No conspicuous teeth ventrally. Some dorsal setulae stronger than surrounding setulae. Surstylus with 2 black teeth on distal margin. No setulae on inner surface. Phallus sheath as illustrated in Fig. 208.

Female. Unknown.



Figs 205–210. Terminalia (♂) of *Stylogaster pseudofanjae* sp. n. (holotype): (205) surstylus, lateral view; (206) same, dorsal view; (207) same, ventral view; (208) phallus sheath of hypandrium, lateral view; (209) cercus, lateral view; (210) sperm pump and ejaculatory apodeme. Abbreviations: *ce* – cercus; *su* – surstylus. Not to scale.

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Holotype: ♂ MADAGASCAR: (1) "Madagascar / Province Fianarantsoa / Parc National Ranomafana / radio tower at forest edge / elev 1130 m / 27. June-12. July 2005"; (2) "21°15.05'S 47°24.43'E / coll. M. Irwin, R. Harin'Hala / coll. California Acad. of Science / malaise, mixed tropical forest / MA-02-09B-118"; (3) "Holotypus / *Stylogaster* / *pseudofanjae* ♂ / des. Stuke, 2011" (CAS). Left wing, right hind tarsi and several setae damaged. Abdomen dissected, macerated and deposited in glycerine in a microvial pinned beneath specimen, holotype otherwise in good condition.

Distribution: Endemic to Madagascar.

Bionomics: Sampled in primary rainforest at moderately high elevation (1130 m).

Stylogaster ranomafanensis sp. n.

Figs 211–222

Etymology: The species is named after the *locus typicus*, Ranomafana National Park in Madagascar.

Diagnosis: The conspicuous black margin on the dorsal inner surface of the cercus and the long tooth with two pairs of black spines (Figs 219, 220) distinguish *S. ranomafanensis* sp. n. from all other known Afrotropical *Stylogaster* spp. *Stylogaster spinicercus* sp. n. has an additional black spine on the cercus that is not present on the cercus of *S. ranomafanensis* sp. n. Without dissection of the terminalia *S. ranomafanensis* sp. n. may be confused with *S. clementsi* sp. n. Both species belong to a group of *Stylogaster* spp. with dark markings on the abdomen and long setulae on the mid femur, but no long setulae on the hind femur; both share the light orange-brown mesoscutum.

Description (based on holotype):

Male.

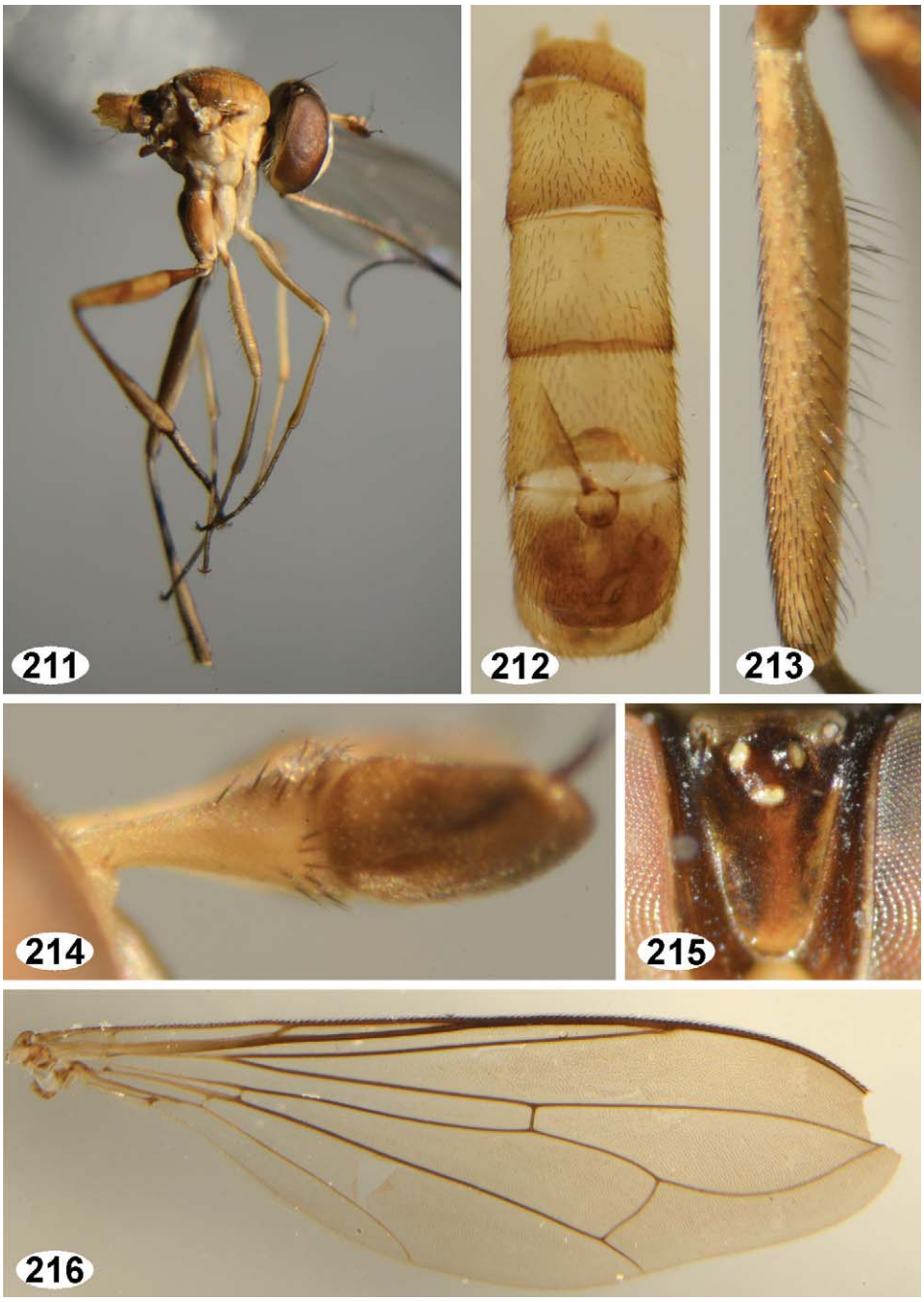
Overall length: *ca* 7.0 mm.

Head: 1.4 mm high. Eye brown, with a few scattered inconspicuous ommatrichia. Facets on inner side slightly enlarged. Ocelli pale yellow-brown. Ocellar tubercle brown, with 1 pair of ocellar setae. Ocellar triangle occupies virtually entire frons, reaching as far as antennae (Fig. 215). Ocellar triangle brown. Frons brown lateral to ocellar triangle, with 2–4 proclinate, fronto-orbital setae. Scapus and pedicellus yellow-brown, basal flagellomere brown. Arista dark brown, 3 segments evident, situated dorsally on basal flagellomere (Fig. 214). Scapus with a few brown setulae dorsally. Pedicellus with black setulae. Shape of antenna as illustrated in Fig. 214. One distinct black vertical seta (1 damaged). Face pale yellow with silver pruinosity. Occiput black, distinctly silver pruinose; with row of regularly-arranged small white setulae dorsally, and several longer white setulae ventrally. Some long white setulae on mouth opening. Proboscis mainly brown, except for white distal division of labellum. Labrum *ca* 3.0 mm, labellum approximately same length.

Thorax: Yellow-brown, mesoscutum (with exception of postpronotum and postalar calli), scutellum and mediotergite pale brown. All setae black with exception of golden seta on the propleuron. Two notopleural setae, 1 supra-alar seta (both damaged), 2 postalar setae (3 damaged), 1 praescutellar dorsocentral seta (1 damaged), 1 apical scutellar seta (both damaged), 1 seta on anepimeron and 1 seta above fore coxa on propleuron. A few black setulae on anepimeron. Black semi-adpressed setulae on mesoscutum.

Wing: Length 5.4 mm. Generally clothed in microtrichia, but *bc*, most of *c*, bases of r_1 and r_{2+3}, most of *br*, *bm*, base of *dm*, *cup* and base of anal lobe virtually without

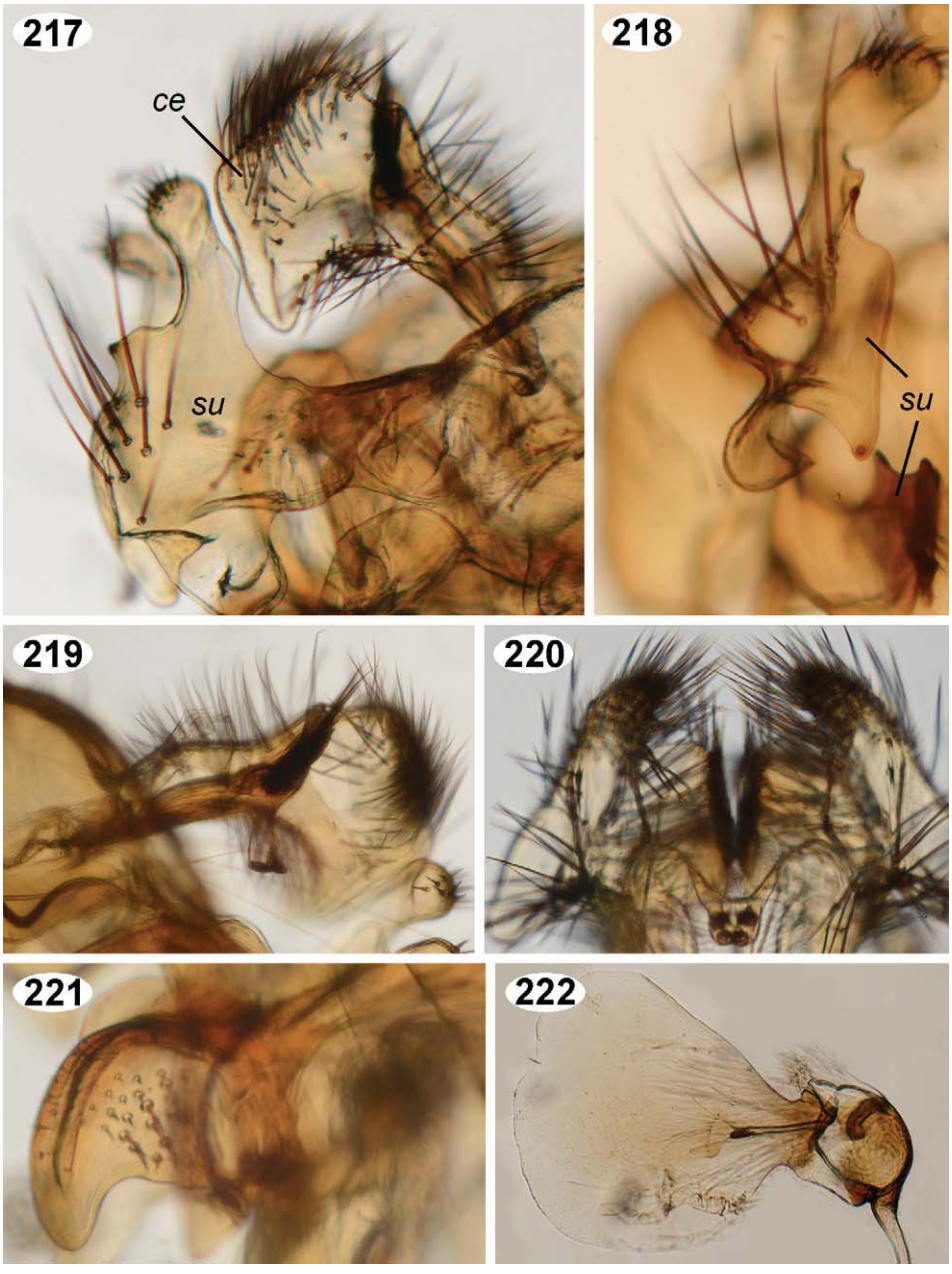
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Figs 211–216. *Stylogaster ranomafanensis* sp. n. (♂ holotype): (211) habitus, lateral view; (212) abdomen, dorsal view; (213) mid femur, ventral view; (214) antenna, lateral view; (215) frons; (216) wing. Not to scale.

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microtrichia. Hind margin of wing with pale brown setulae. Venation as in Fig. 216. Haltere uniformly pale yellow, knob brown, with areas of sensillae at base.



Figs 217–222. Terminalia (♂) of *Stylogaster ranomafanensis* sp. n. (holotype): (217) surstylus and cercus, lateral view; (218) surstylus, ventral view; (219) cercus, lateral view; (220) same, ventral view; (221) phallus sheath of hypandrium, lateral view; (222) sperm pump and ejaculatory apodeme. Abbreviations: *ce* – cercus; *su* – surstylus. Not to scale.

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Legs: Whitish yellow, hind femur brown dorsally at apex and dorsally at base, with lighter area in-between. Legs with black and white setulae, setae on coxae white with exception of few black setae on hind coxa. Fore and mid coxae with 2 long yellow seta and some shorter setulae. Hind coxa on inner surface with group of black distal setae and no strong seta on outer surface. Hind trochanter without teeth or conspicuous setulae. Mid femur posteriorly with a row of regularly-arranged black setulae in basal half and black and white setulae ventrally longer than diameter of mid tibia. Hind tibia with 3 short black spines on anterior surface. Claws brown basally, black distally. Pulvilli brown. Empodia short, brown.

Abdomen: Yellow-brown, with tergite 1 mainly brown, tergites 2–5 with brown posterior margin (barely visible in macerated abdomen), tergite 6 with broad brown median fascia, epandrium without brown markings (Fig. 212). Tergites with semi-adpressed black setulae, and longer setulae laterally on tergite 5. Tergite 1 with long white setulae laterally, tergite 2 with 0–4 lateral black setae on anterior margin and 3–5 long white setae on either side. Terminalia as illustrated in Figs 217–222. Cercus broadened distally (Figs 217, 219). Dorsal margin concave. Cercus with long tooth, 2 black spines distally and conspicuous black margin on dorsal inner surface of cercus (Fig. 219). Surstylus with two pale brown teeth distally. A few setulae on inner surface. Phallus sheath as illustrated in Fig. 221. Few long brown setulae on inner surface.

Female. Unknown.

Holotype: ♂ MADAGASCAR: (1) "Madagascar, Fianarantsoa Prov., 17 km / W Ranomafana Vohiparara, / Ranomafana Natl Park, malaise in / rainforest, 22.-29. IV.2002, / 1110m, R Harin'Hala, ME Irwin, / 21°13. 57'S. 47°22. 19'E. MG 9A-26"; (2) "Holotypus / *Stylogaster* / *ranomafanensis* ♂ / des. Stuke, 2011" (CAS). Right hind tarsi and several setae damaged. Left wing damaged placed in glycerine. Abdomen dissected, macerated and deposited in glycerine in a microvial pinned beneath specimen, holotype otherwise in good condition.

Distribution: Endemic to Madagascar.

Bionomics: Sampled from moderately high elevation (1110 m) in primary rainforest.

Stylogaster rinhaii sp. n.

Figs 223–235

Etymology: The species is named in honour of Harin'Hala (Rin'ha) Rasolondalao (Antananarivo), who coordinated collecting efforts in Madagascar and who made this project such a success.

Diagnosis: *Stylogaster rinhaii* sp. n. belongs to a species-group with darkened posterior margins on some tergites (Fig. 225) and a white setulose distal area on the hind tibia (Fig. 227). It differs from the other two species of this group (*S. kroeberi* sp. n. and *S. malgachensis* Camras) in having a broad orange-brown ocellar triangle, bordered a the black frons (Fig. 228) and only slightly enlarged facets. The ♂ terminalia (Figs 229–235) are diagnostic, especially in respect of the long black setulae on the inner surface of the surstylus, which are unique (Fig. 231).

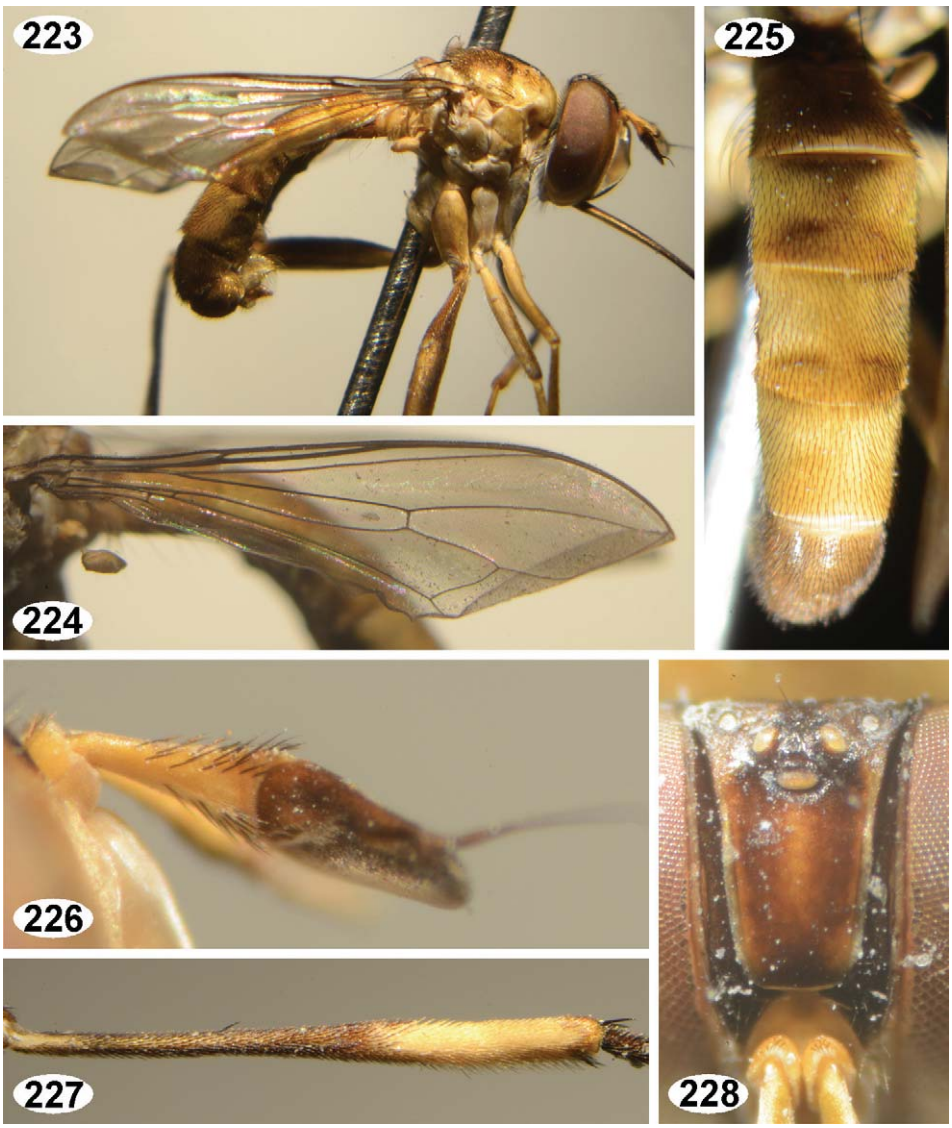
Description (based on holotype):

Male.

Length: *ca* 7.5 mm.

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Head: 1.8 mm high. Eye dark brown, with a few scattered, inconspicuous ommatrichia. Facets on inner side slightly enlarged. Ocelli yellow-brown. Ocellar tubercle blackish brown, with 1 pair of ocellar setae. Ocellar triangle occupies virtually entire frons, reaching as far as antennae (Fig. 228). Ocellar triangle brown. Frons lateral to ocellar triangle black, with 4 fronto-orbital setae. Scapus and pedicellus orange-brown, basal flagellomere brown. Arista dark brown, 3 segments evident. Arista situated dorsally at apex of basal flagellomere (Fig. 226). Scapus with few black setulae dorsally. Pedicellus with black setulae. Shape of antenna as illustrated in Fig. 226. One distinct vertical seta

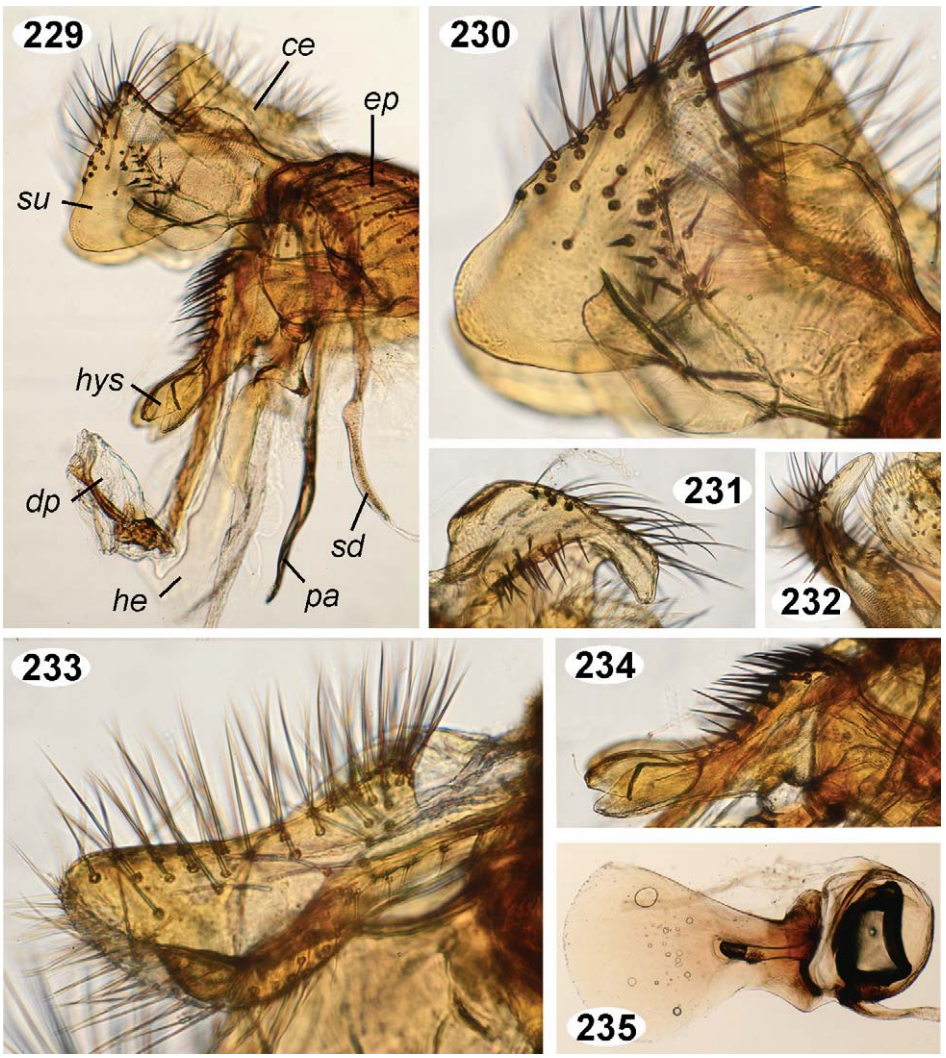


Figs 223–228. *Stylogaster rinhaii* sp. n. (♂ holotype): (223) habitus, lateral view; (224) wing; (225) abdomen, dorsal view; (226) antenna (lateral view); (227) hind femur; (228) frons. Not to scale.

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is damaged. Face pale yellow with silver pruinosity. Occiput black to brown, distinctly silver pruinose; with row of regularly-arranged small white setulae dorsally, and several longer white setulae ventrally. Some long white setulae on mouth opening. Proboscis pale brown basally, becoming blackish brown distally except for yellow-brown distal division of labellum. Labrum *ca* 3.2 mm, labellum approximately same length.

Thorax: Yellow-brown, mesoscutum medially pale brown. All discernible setae black with exception of golden seta on anepimeron. Two notopleural setae (only one remains), 1 damaged supra-alar seta, 2 damaged postalar setae, 1 praescutellar dorsocentral seta,



Figs 229–235. Terminalia (♂) of *Stylogaster rinhaii* Camras (♂ paratype): (229) terminalia, lateral view; (230) surstylus, lateral view; (231) same, ventral view; (232) same, dorsal view; (233) cercus, lateral view; (234) phallus sheath of hypandrium, lateral view; (235) sperm pump and ejaculatory apodeme. Abbreviations: *ce* – cercus; *dp* – distiphallus; *ep* – epandrium; *he* – hemispherical extension; *hys* – phallus sheath of hypandrium; *pa* – phallus apodeme; *sd* – sperm duct; *su* – surstylus. Not to scale.

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1 apical scutellar seta (left damaged), 1 damaged seta on anepimeron and 1 seta above fore coxa on propleuron. Black semi-adpressed setulae on mesoscutum.

Wing: Length 5.7 mm. Generally clothed in microtrichia, but base of *sc*, base of radial cells r_1 and r_{2+3}, partly *br*, *bm*, base of *dm* and *cup* without microtrichia. Hind margin of wing with black or brown setulae. Venation as in Fig. 224. Haltere uniformly yellow-brown, with areas of sensillae at base.

Legs: Yellow-brown with a brown patch at base of hind femur, brown areas on hind tibia, conspicuous white distal area on hind tibia and conspicuous black hind tarsi. Legs with black and white setulae and golden setae, only left hind coxa with 1 black seta. Fore and mid coxa without distinct setae, but with strong golden setulae distally. Hind coxa with strong golden setulae distally on anterior surface, with smaller golden setulae laterally, and 1 outstanding lateral seta. Hind trochanter without teeth, but with dense golden setulae. Mid femur with a row of regularly-arranged golden setulae posteriorly in distal half. Hind tibia with single short black spines on anterior surface. Claws only narrowly brown basally, distally black. Pulvilli brown. Empodia short, pale brown.

Abdomen: Mainly orange-brown, tergite 1 brownish, tergites 3–5 with indistinctly darker posterior margins, tergite 6 dark brown (Fig. 225). Tergites with semi-adpressed black setulae. Tergite 1 with long golden setulae laterally, tergite 2 with 5 black lateral setae on either side of anterior margin. Abdomen of holotype not dissected, but appears to match terminalia of a paratype. Terminalia as illustrated in Figs 229–235. Cercus slightly elongated (Fig. 233). Dorsal margin concave. Cercus with only a small lappet ventrally. No conspicuous teeth ventrally. No black setae. Surstylus with several black short setae medially on distal margin (Fig. 230). Several long, conspicuous, erect black setulae on inner surface (Fig. 231). Also 1 lappet on inner side. Phallus sheath as illustrated in Fig. 234. Strong black setulae conspicuous basally.

Female. Unknown.

Holotype: ♂ MADAGASCAR: (1) "Madagascar, Fianarantsoa Prov., 12km / W Ranomafana Natl Pk entrance, / radio tower, malaise in montane / tropical forest, 6.-17.VII.2003 / R H'Hala, ME Irwin, 1215m, / 21°15.05'S. 47°24.43'E. MA 9B-66"; (2) "Holotypus / *Stylogaster* / *rinhaii* ♂ / des. Stuke, 2011" (CAS). Holotype complete and in good condition.

Paratypes: MADAGASCAR: *Fianarantsoa*: 1♂ radio tower at forest edge, 1130 m, 21°15.05'S 47°24.43'E, 9–25.ix.2005, R. Harin'Hala & M.E. Irwin (J-HS).

Distribution: Endemic to Madagascar.

Bionomics: Sampled in primary rainforest at moderately high elevation (1215 m).

Stylogaster schachti sp. n.

Figs 236–247

Etymology: The species is named in honour of late Wolfgang Schacht (1939–2011), a prominent German dipterist, who spent considerable time building the Diptera collection in Munich and made a major contribution to faunistic research on the Diptera.

Diagnosis: *Stylogaster schachti* sp. n. belongs to the *Stylogaster* species-group having long setulae on the mid femur, but without long setulae on the hind femur. It is distinguished from the other species of this group (*S. clementsi* sp. n., *S. smithi* sp. n., *S. ranomafanensis* sp. n.), by the long basal flagellomere (Fig. 238) and the diagnostic male terminalia (Figs 242–247).

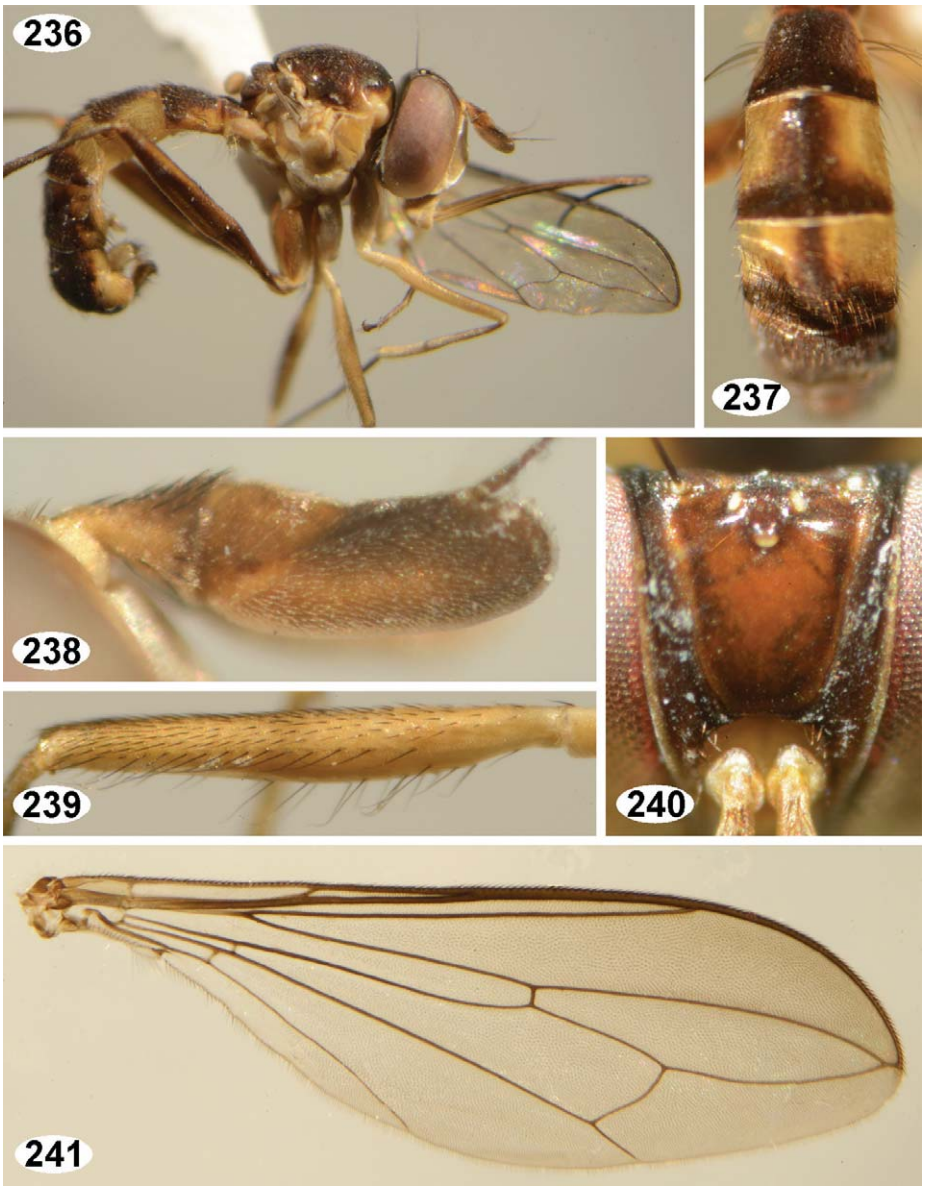
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Description (based on holotype):

Male.

Length: *ca* 5.5 mm.

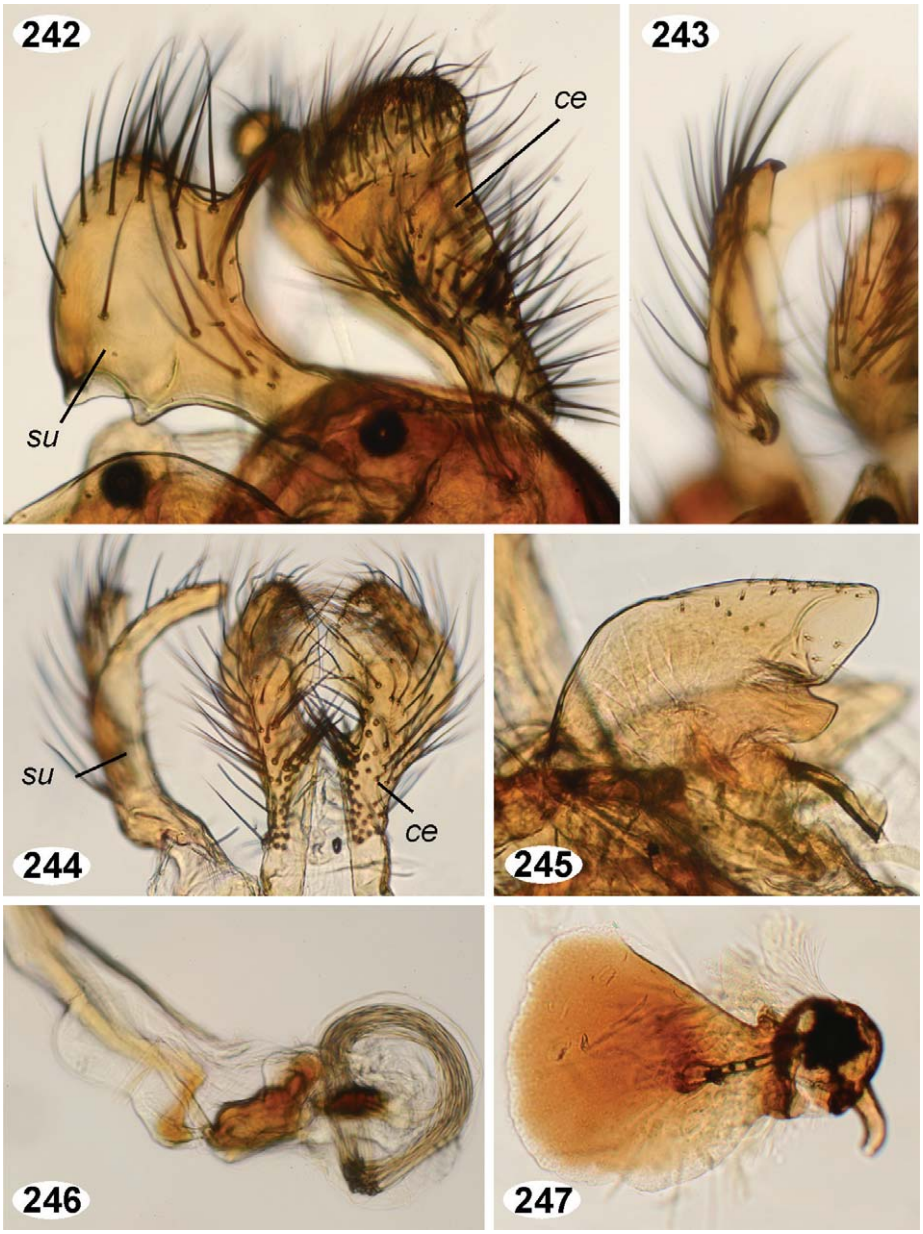
Head: 1.1 mm high. Eye brown, with a few scattered, inconspicuous ommatrichia. Facets on inner side slightly enlarged. Ocelli pale yellow-brown. Ocellar tubercle brown, with



Figs 236–241. *Stylogaster schachti* sp. n. (♂ holotype): (236) habitus, lateral view; (237) abdomen, dorsal view; (238) antenna, lateral view; (239) mid femur, ventral view; (240) frons; (241) wing. Not to scale.

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1 pair of ocellar setae. Ocellar triangle occupies virtually entire frons, reaching as far as antennae (Fig. 240). Ocellar triangle brown. Frons blackish brown lateral to ocellar triangle, with 3 proclinate, fronto-orbital setae. Scapus and pedicellus yellow-brown,



Figs 242–247. Terminalia (♂) of *Stylogaster schachti* sp. n. (holotype): (242) surstylus and cercus, lateral view; (243) surstylus, ventral view; (244) cerci and surstylus, dorsal view; (245) phallus sheath of hypandrium, lateral view; (246) apex of distiphallus; (247) sperm pump and ejaculatory apodeme. Abbreviations: *ce* – cercus; *su* – surstylus. Not to scale.

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basal flagellomere brown. Arista dark brown, 3 segments evident, situated dorsally on basal flagellomere (Fig. 238). Scapus with few black setulae dorsally. Pedicellus with black setulae. Shape of antenna as illustrated in Fig. 238. One distinct black vertical seta (1 damaged). Face pale yellow with silver pruinosity. Occiput black, distinctly silver pruinose; with a row of regularly-arranged small white setulae dorsally, and several longer white setulae ventrally. Some long white setulae on mouth opening. Proboscis yellow-brown basally, becoming dark brown distally, except for yellow-brown distal division of labellum. Labrum *ca* 2.2 mm, labellum approximately same length.

Thorax: Yellow-white; mesoscutum (with exception of postpronotum and postalar calli), scutellum and mediotergite blackish brown. All setae damaged with exception of 3 black notopleural setae and 1 white seta on propleuron. Scars of 2 notopleural setae, 1 supra-alar seta, 2 postalar setae, 1 praescutellar dorsocentral seta, 1 apical scutellar seta, 1 seta on anepimeron and 1 seta above fore coxa on propleuron. A few black setulae on anepimeron. Black semi-adpressed setulae on mesoscutum.

Wing: Length 4.2 mm. Generally clothed in microtrichia, but base of *c*, base of *br*, *bm*, base of *dm*, *cup* and basal half of anal lobe virtually without microtrichia. Hind margin of wing with pale brown setulae. Venation as in Fig. 241. Haltere uniformly pale yellow, knob brown, with areas of sensillae at base.

Legs: Whitish yellow, hind femur brown dorsally. Legs mainly with black or brown setulae, only fore and mid tibiae with pale yellow setulae. Setae on fore and mid coxae white, setae on hind coxa black. Fore and mid coxae with 1 long yellow seta and additionally with some shorter setulae. Hind coxa with group of black distal setae on inner surface and 1 black seta on outer surface. Hind trochanter without teeth or conspicuous setulae. Mid femur with a row of regularly-arranged black setulae posteriorly on the basal half, and black setulae ventrally, distinctly longer than diameter of mid tibia. Hind tibia with 1–3 short black spines on anterior surface. Claws brown basally, distally black. Pulvilli yellow-white. Empodia short, pale yellow-brown.

Abdomen: Yellow-brown, with tergites 1–2 broadly brown medially, tergites 3–4 with brown posterior margin and small brown median fascia, tergites 5–6 and epandrium mainly dark brown (Fig. 237). Tergites with semi-adpressed black setulae and longer setulae laterally on tergite 5. Tergite 1 with long white setulae laterally, tergite 2 with 4 lateral black setae on anterior margin and 1 or 2 long white setae on either side. Terminalia as illustrated in Figs 242–247. Cercus rounded distally (Fig. 242). Dorsal margin concave. Cercus with long, strong black spines dorsally (Fig. 244), and small keel ventrally, with 2 black spines. Surstylus with long black setulae mainly at apex (Fig. 242), two black spines distally and few scattered setulae on inner surface. Phallus sheath as illustrated in Fig. 245.

Female. Unknown.

Holotype: ♂ MADAGASCAR: (1) "Madagascar: Province / Fianarantsoa, Parc National / Ranomafana, radio tower / at forest edge, elev 1130m / 16.-26. November 2003 "; (2) "21°15.05'S 47°24.43'E / coll: M. Irwin, R. Harin'Hala / California Acad of Sciences / malaise, mixed tropical / forest MA-02-09B-79"; (3) "Holotypus / *Stylogaster* / *schachti* ♂ / des. Stuke, 2011" (CAS). Some setae damaged. Left wing damaged and deposited in glycerine. Abdomen dissected, macerated and deposited in glycerine in a microvial pinned beneath specimen, holotype otherwise good condition.

Distribution: Endemic to Madagascar.

Bionomics: Sampled in primary rainforest at moderately high elevation (1130 m).

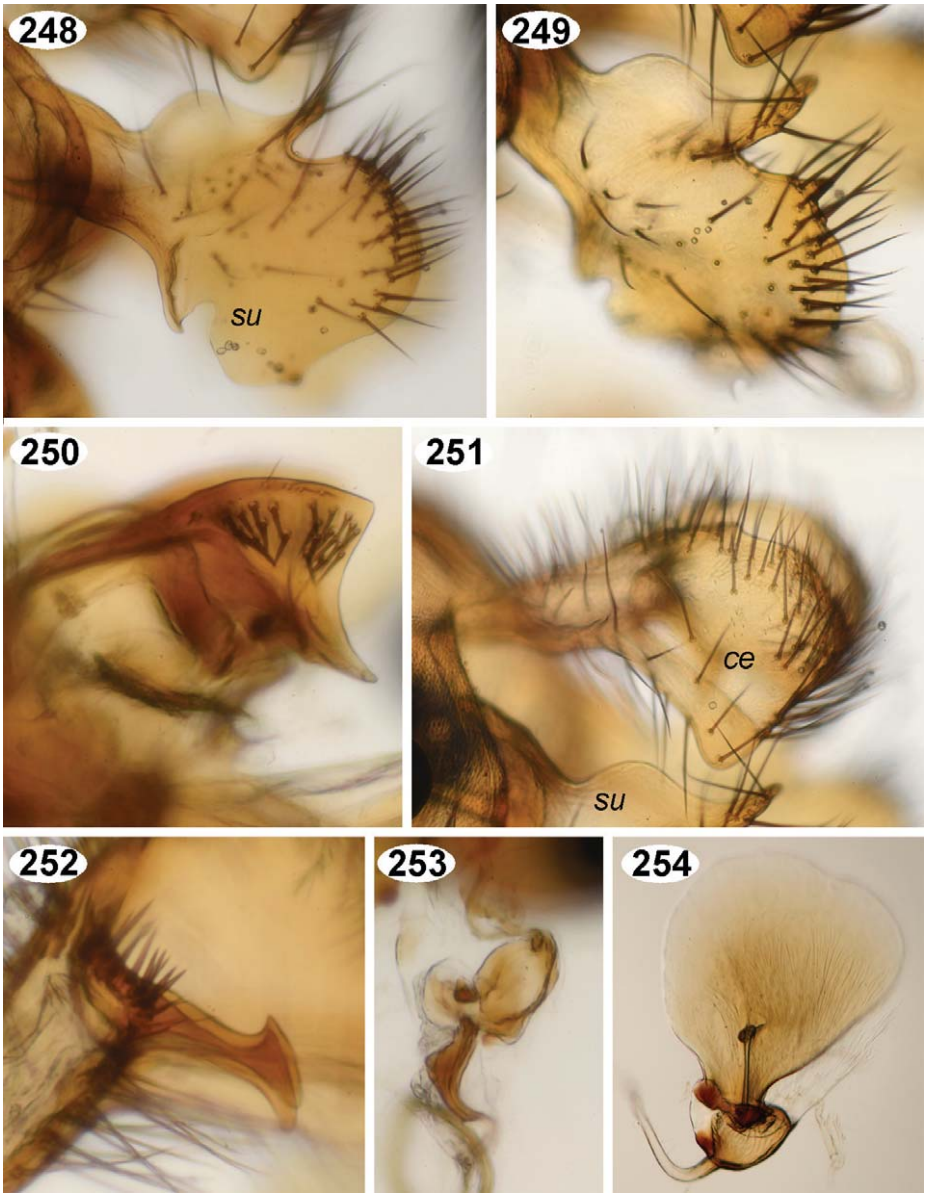
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Stylogaster seguyi Camras, 1962

Figs 248–254

Stylogaster seguyi Camras, 1962*b*: 184, 185 (Type locality: "Madagascar: Mtge. d'Ambre").

Literature: Camras (1962*b*), Smith (1967).



Figs 248–254. Terminalia (♂) of *Stylogaster seguyi* Camras (holotype): (248) surstylus, lateral view; (249) same, dorsolateral view; (250) phallus sheath of hypandrium, lateral view; (251) cercus, lateral view; (252) teeth at the ventral conjunction of the cerci, lateral view; (253) distiphallus; (254) sperm pump and ejaculatory apodeme. Abbreviations: *ce* – cercus; *su* – surstylus. Not to scale.

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Holotype (examined): ♂ MADAGASCAR: (1) "Holotype ♂ / *Stylogaster* / seguy / Camras" [red label, partially handwritten]; (2) "Madagascar. D.-S. / Mtge. D'Ambre / 12.V.1958 F. KEISER" (NHMB). Abdomen dissected, macerated and deposited in glycerine in a microvial pinned beneath specimen. Holotype is complete and in perfect condition.

Distribution: Endemic to Madagascar, known only from unique holotype.

Bionomics: Parc National de la Montagne d'Ambre is a volcanic massif (1475 m), covered in montane rainforest that rises from the surrounding dry plains.

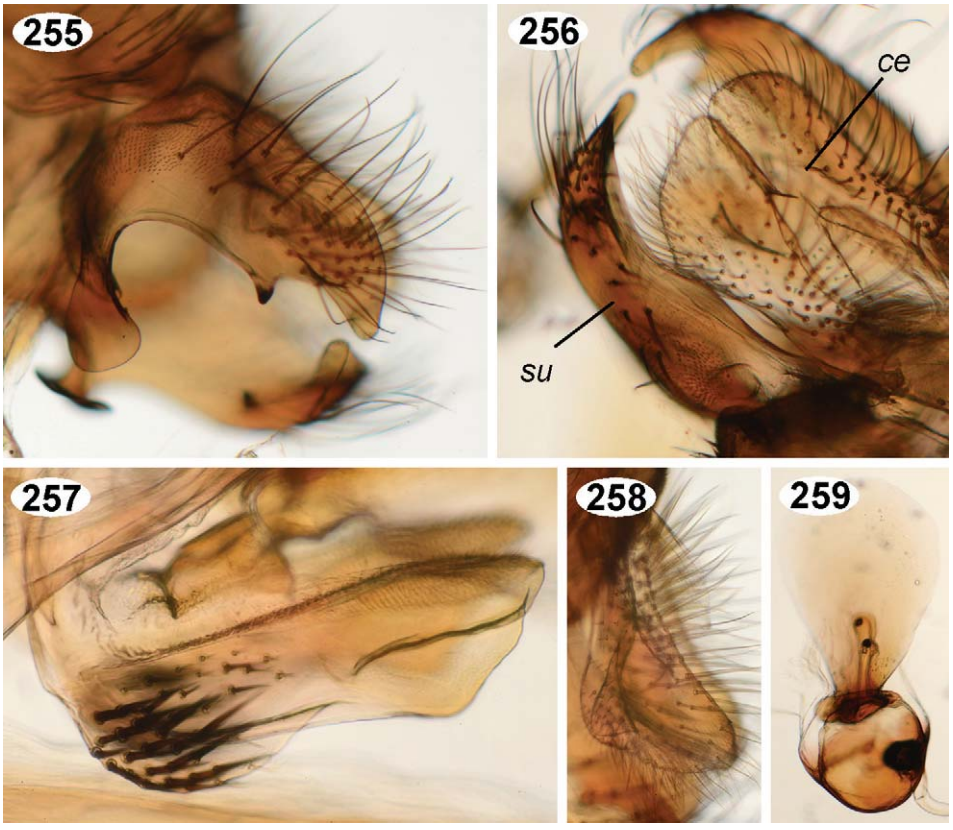
Stylogaster seyrigi Séguy, 1932

Figs 255–259

Stylogaster seyrigi Séguy, 1932: 161, 162 (Type locality: "Madagascar: Rogez").

Literature: Séguy (1932), Smith (1967).

Séguy's (1932) description of *S. seyrigi* was based on two syntypes (♂ and ♀). Smith (1967) noted that Séguy's description of the male did not accord with that of the female. Based on examination of photographs of the syntypes, the male is here identified as *S. pauliani* Camras, bearing the labels: (1) "MUSEUM PARIS / MADAGASCAR / PROV



Figs 255–259. Terminalia (♂) of *Stylogaster seyrigi* Séguy (Madagascar, Parc National Ranomafana): (255) surstylus, lateral view; (256) surstylus and cerci, dorsolateral view; (257) phallus sheath of hypandrium, lateral view; (258) cercus, lateral view; (259) sperm pump and ejaculatory apodeme. Abbreviations: *ce* – cercus; *su* – surstylus. Not to scale.

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D'ANALALAVA / MAROMANDIA / R. DECARY 1923" [blue label]; (2) "*Stylogaster* / *seyrigi* ♂. / E. SÉGUY det. 1932" [partly handwritten] (MNHN). To prevent any future confusion, the female is hereby designated as the lectotype, bearing the labels: (1) "TYPE"; (2) "Madagascar / Rogez / VI. 30 / A. Seyrig"; (3) "*Stylogaster* ♀ / *seyrigi* Typ. / E. SÈGUY det 1932" (MNHN). This designation conforms to the interpretation of *S. seyrigi* by Smith (1967).

The assignment of the male reported below as *S. seyrigi* is justified as follows: males of two species (*S. seyrigi* and *S. stuckenbergi* sp. n.) are very similar, but can be distinguished by colouration of the pleura and characters of the terminalia. The same differences in the colouration of the pleura are found in females with very long and diagnostic terminalia, which is typical for *S. seyrigi* (Séguy 1932). Therefore, those males with black maculae on the pleura are identified as *S. seyrigi*.

Material examined: MADAGASCAR: *Fianarantsoa*: 1♂ Parc National Ranomafana, radio tower, at forest edge, 21°15.05'S 47°24.43'E, 1130 m, 15–26.ii.2006, M. Irwin & R. Harin'Hala, Malaise trap (CAS).

Distribution: Endemic to Madagascar.

Bionomics: Found in primary rainforest at moderately high elevation (1130–1215 m).

Stylogaster smithi sp. n.

Figs 260–272

Etymology: The species is named in honour of Kenneth G.V. Smith, who published some of the most important papers concerning Afrotropical Conopidae, especially a significant work concerning Afrotropical *Stylogaster*.

Diagnosis: *Stylogaster smithi* sp. n. belongs to a species-group with dark markings on the abdomen and long setulae on the mid femur, but without long setulae on the hind femur. Of the species belonging to this group, only *S. smithi* sp. n. and *S. schachti* sp. n. exhibit the blackish brown mesoscutum (Fig. 260). *S. schachti* sp. n. has an elongated basal flagellomere (Fig. 238), which distinguishes it from *S. smithi* sp. n. The male terminalia of the last-mentioned species distinguishes it from all other species of this group.

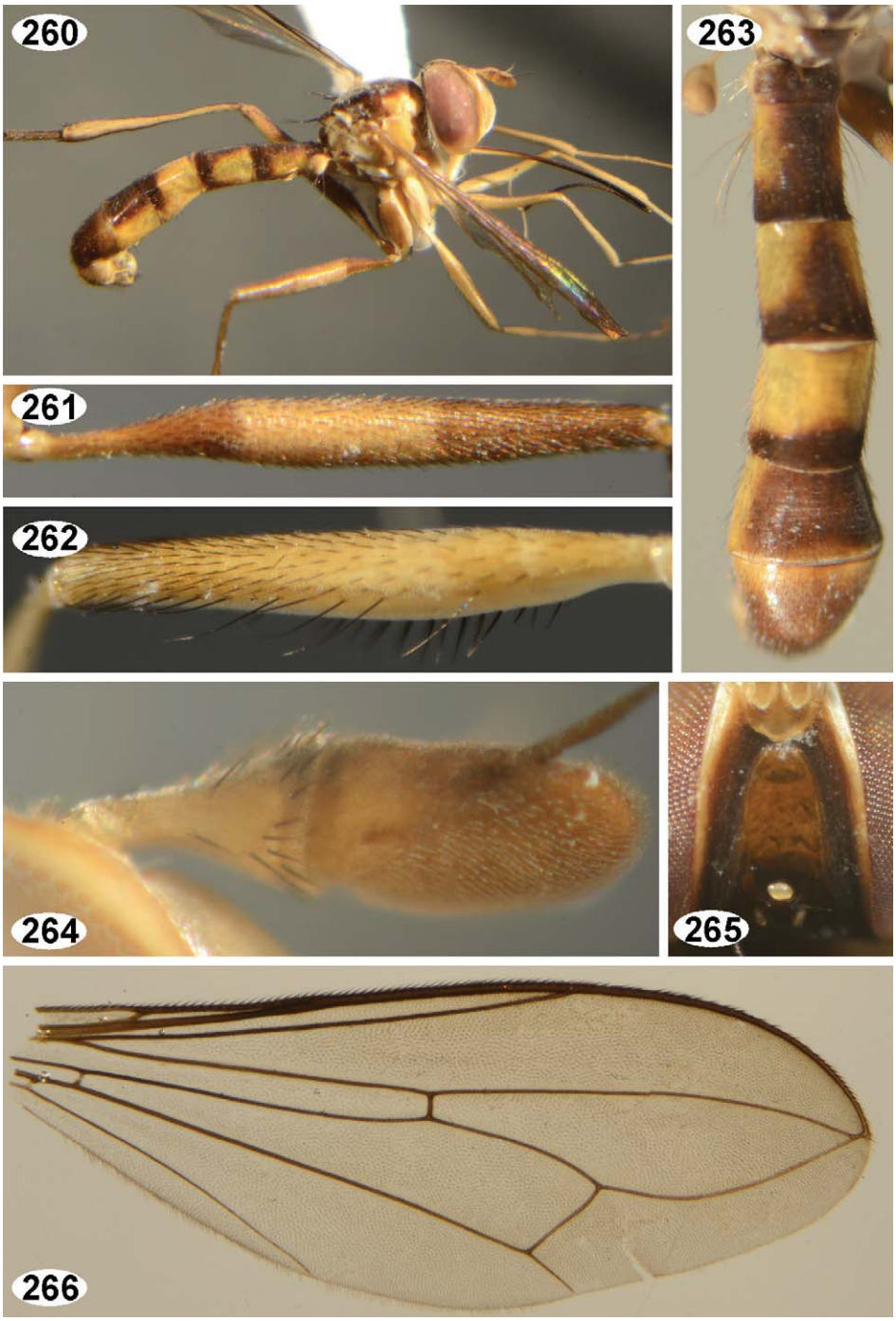
Description (based on holotype):

Male.

Overall length: *ca* 5.5 mm.

Head: 1.2 mm high. Eye brown, with a few scattered inconspicuous ommatrichia. Facets on inner side slightly enlarged. Ocelli yellow-brown. Ocellar tubercle dark brown, with 1 pair of ocellar setae. Ocellar triangle occupies virtually entire frons, reaching as far as antennae (Fig. 265). Ocellar triangle dark brown. Frons blackish brown lateral to ocellar triangle, with 1 proclinate fronto-orbital seta. Scapus and pedicellus yellow-brown, basal flagellomere pale brown. Arista brown, only 2 segments evident. Arista situated dorsally on basal flagellomere (Fig. 264). Scapus with a few black setulae dorsally. Pedicellus with black setulae. Shape of antenna as illustrated in Fig. 264. One distinct black vertical seta (1 damaged). Face pale yellow with silver pruinosity. Occiput black, distinctly silver pruinose; with a row of regularly-arranged small white setulae dorsally, and several longer white setulae ventrally. Some long white setulae on mouth opening. Proboscis yellow-brown basally, becoming dark brown distally,

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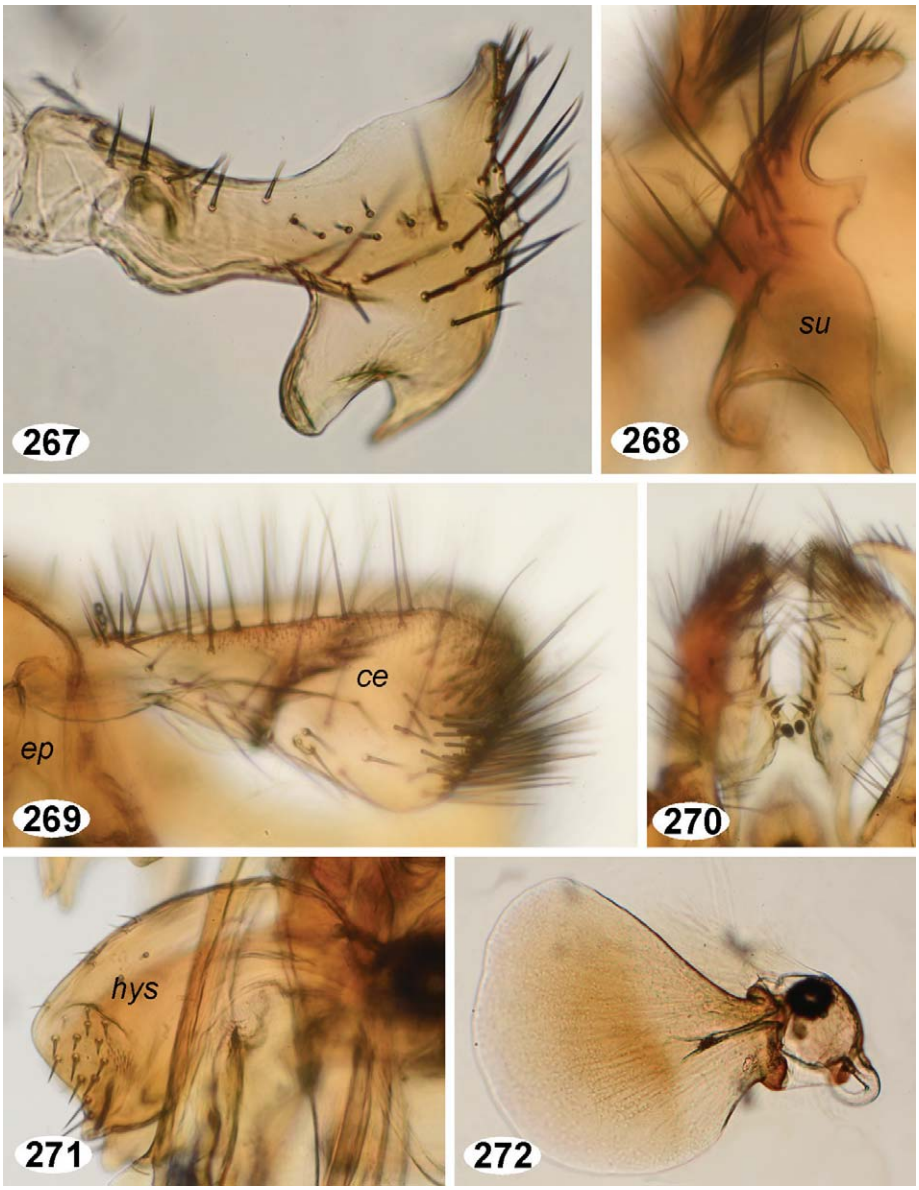


Figs 260–266. *Stylogaster smithi* sp. n. (♂ holotype): (260) habitus, lateral view; (261) hind femur; (262) mid femur; (263) abdomen, dorsal view; (264) antenna, lateral view; (265) frons; (266) wing. Not to scale.

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except for the yellow-brown distal division of labellum. Labrum *ca* 2.3 mm, labellum approximately same length.

Thorax: Yellow-brown; mesoscutum (with exception of postpronotum and postalar calli), scutellum and mediotergite blackish brown. Setae black, with exception of golden seta



Figs 267–272. Terminalia (♂) of *Stylogaster smithi* sp. n. (holotype): (267) surstylus, lateral view; (268) same, dorsal view; (269) cercus, lateral view; (270) teeth at ventral conjunction of cerci, ventral view; (271) phallus sheath of hypandrium, lateral view; (272) sperm pump and ejaculatory apodeme. Abbreviations: *ce* – cercus; *ep* – epandrium; *hys* – phallus sheath of hypandrium; *su* – surstylus. Not to scale.

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on propleuron. Two notopleural setae, 1 supra-alar seta, 2 postalar setae, 1 praescutellar dorsocentral seta, 1 apical scutellar seta, 1 seta on anepimeron and 1 seta above fore coxa on propleuron. A few black setulae on anepimeron. Black semi-adpressed setulae on mesoscutum.

Wing: Length 4.2 mm. Generally clothed in microtrichia, but base of *br*, *bm*, very narrowly at base of *dm* and *cup* almost without microtrichia. Hind margin of wing with pale brown setulae. Venation as in Fig. 266. Haltere uniformly pale yellow, knob brown, with areas of sensillae at base.

Legs: Whitish yellow, hind femur brown dorsally at apex and dorsally at base, leaving a lighter area in-between. Legs mainly with black or brown setulae, only fore and mid tibiae with pale yellow setulae. Setae on fore coxa white, setae on mid and hind coxae black. Fore coxa with 2 long yellow setae and some shorter setulae. Mid coxa with 1 black seta and some shorter setulae. Hind coxa on inner surface with group of black distal setae, and 1 black seta on outer surface. Hind trochanter without teeth or conspicuous setulae. Mid femur with a row of regularly-arranged black setulae posteriorly on basal half and strong black setulae ventrally, slightly longer than diameter of mid tibia. Hind tibia with 3 or 4 short black spines on anterior surface. Claws brown basally, distally black. Pulvilli yellow-white. Empodia short, yellow-white.

Abdomen: Yellow-brown, with tergite 1 broadly brown medially, tergite 2 with brown posterior margin and broad median fascia, tergite 3 with brown posterior margin and smaller median fascia, tergite 4 with brown posterior margin and no median fascia, tergites 5–6 with broad brown medial fascia, and epandrium only with indistinct pale brown markings (Fig. 263). Tergites with semi-adpressed black setulae and longer setulae laterally on tergite 5. Tergite 1 with long white setulae laterally, tergite 2 with 5 lateral white setae on either side of anterior margin. Terminalia as illustrated in Figs 267–272. Cercus broad distally (Fig. 269). Dorsal margin straight. Cercus with long tooth, black distally and several strong black setae on dorsal inner surface (Fig. 270). Inner surface with long dense setulae distally. Surstylus without black teeth. Some setulae on inner surface. Phallus sheath as illustrated in Fig. 271. Some setulae conspicuous distally.

Female. Unknown.

Holotype: ♂ MADAGASCAR: (1) "Madagascar: Province / Fianarantsoa, Parc National / Ranomafana, radio tower / at forest edge, elev 1130m / 26 May - 12 June 2005 / 21°15.05'S 47°24.43'E "; (2) "coll: M. Irwin, R. Harin'Hala / California Acad of Sciences / malaise, mixed tropical / forest MA-02-09B-116"; (3) "CASLOT 033465"; (4) "Holotypus / *Stylogaster* / *smithi* ♂ / des. Stuke, 2011" (CAS). Some setae damaged, left wing torn, right wing damaged and deposited in glycerine. Abdomen dissected, macerated and deposited in glycerine in microvial pinned beneath specimen, holotype otherwise in good condition.

Distribution: Endemic to Madagascar.

Bionomics: Sampled in primary rainforest at moderately high elevation (1130 m).

Stylogaster spinicercus sp. n.

Figs 273–284

Etymology: From Latin *spina* (thorn), reflecting the thorn-like black spine on the cercus of this species.

Diagnosis: *Stylogaster spinicercus* sp. n. has the cercus broadened, as does *S. amplicercus* sp. n., but the two species are easily separable by reference to the black setae on the

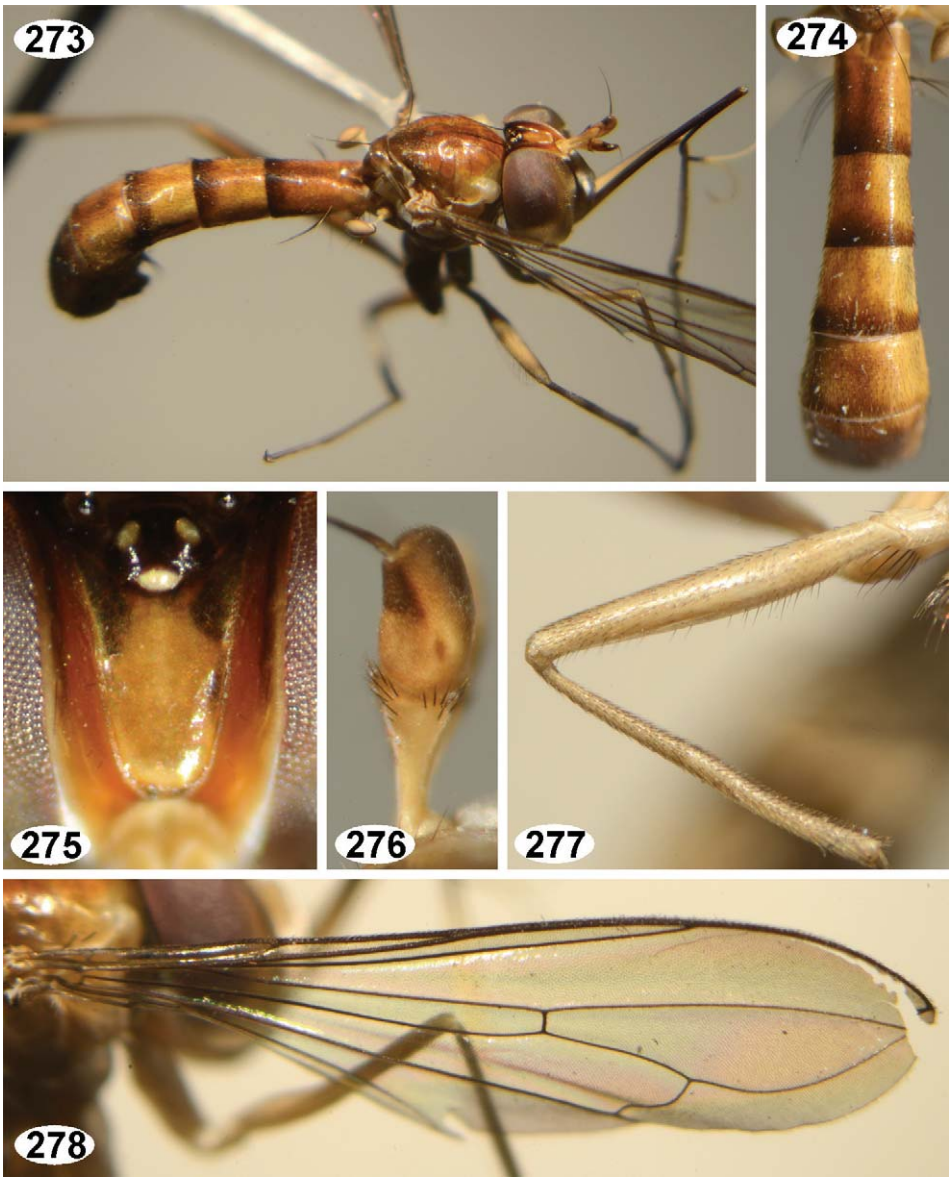
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base of the cercus (Fig. 281) and the unique shape of the surstylus (Fig. 279), having black discal setae.

Description (based on holotype):

Male.

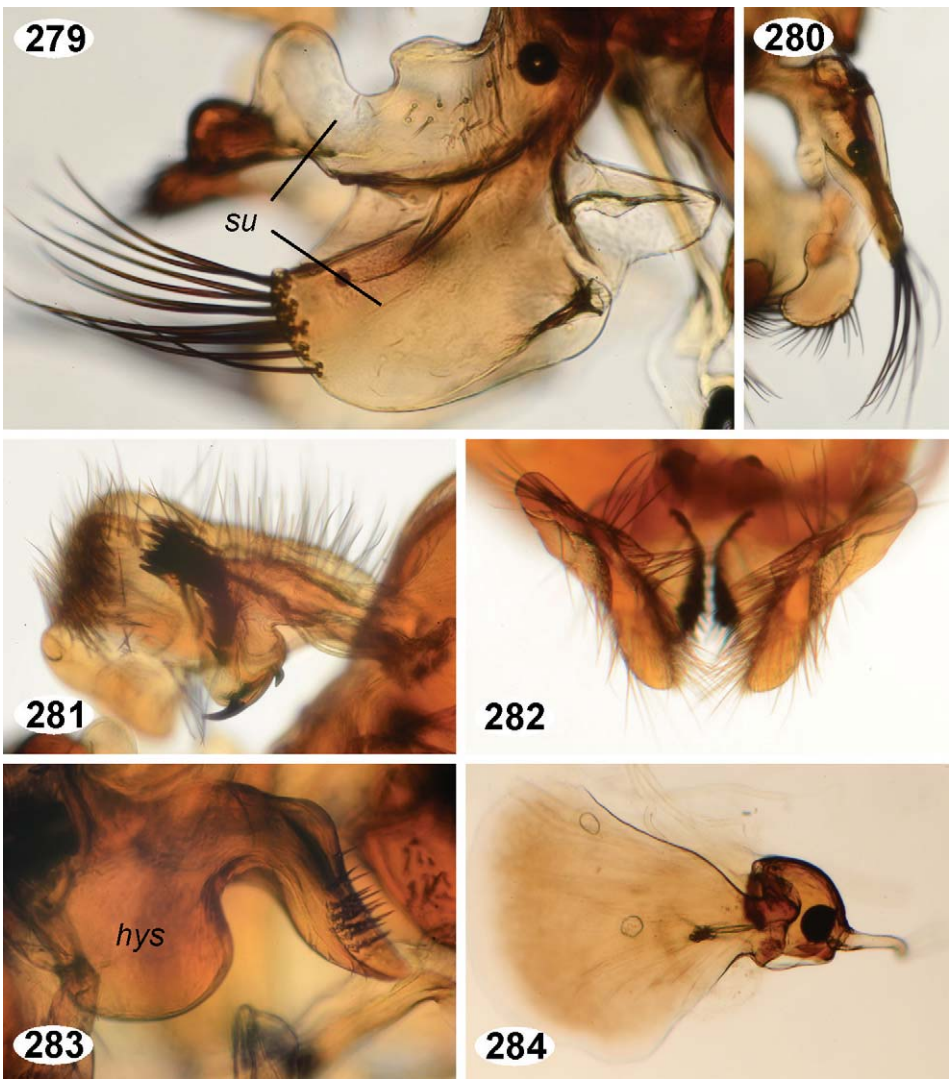
Overall length: *ca* 6.9 mm.



Figs 273–278. *Stylogaster spinicercus* sp. n. (♂ holotype): (273) habitus, lateral view; (274) abdomen, dorsal view; (275) frons; (276) antenna, lateral view; (277) mid leg, anterior view; (278) wing. Not to scale.

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Head: 1.6 mm high. Eye dark brown, with a few scattered, inconspicuous ommatrichia. Facets on inner side slightly enlarged. Ocelli yellow-brown. Ocellar tubercle blackish brown, with 1 pair of damaged ocellar setae. Ocellar triangle occupies virtually entire frons, reaching as far as antennae (Fig. 275). Ocellar triangle yellow-brown. Frons brown lateral to ocellar triangle, with 1–3 small discernible fronto-orbital setae. Scapus and pedicellus yellow-brown, basal flagellomere brown distally. Arista dark brown with a small yellow-brown area basally, 2 segments evident, situated dorsally on apex of basal flagellomere (Fig. 276). Scapus with a few black setulae dorsally. Pedicellus with black



Figs 279–284. Terminalia (♂) of *Stylogaster spinicercus* sp. n. (holotype): (279) surstylus, lateral view; (280) same, dorsal view; (281) cercus, lateral view; (282) same, ventral view; (283) phallus sheath of hypandrium, lateral view; (284) sperm pump and ejaculatory apodeme. Abbreviations: *hys* – phallus sheath of hypandrium; *su* – surstylus. Not to scale.

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setulae. Shape of antenna as illustrated in Fig. 276. One distinct black vertical seta. Face pale yellow with silver pruinosity. Occiput black to brown, distinctly silver pruinose; with a row of regularly-arranged small white setulae dorsally, and several longer white setulae ventrally. Some long white setulae on mouth opening. Proboscis pale yellow basally, becoming dark brown distally, except for yellow-brown distal division of labellum. Labrum *ca* 3.0 mm, labellum approximately same length.

Thorax: Yellow-brown; mesoscutum (with exception of postpronotum), scutellum and mediotergite orange-brown. All undamaged setae on holotype black (supra-alar and dorsocentral setae missing, 1 postalar seta present, all setae on anepimeron missing), with exception of golden seta on propleuron. Two notopleural setae, 1 supra-alar seta, 2 postalar setae, 1 praescutellar dorsocentral seta, 1 apical scutellar seta, 1 seta on anepimeron and 1 seta above fore coxa on propleuron. A few black setulae on anepimeron. Black semi-adpressed setulae on mesoscutum.

Wing: Length 6.1 mm. Generally clothed in microtrichia, but base of *bc*, base of r_1 and very narrowly basally in r_{2+3}, base of *br*, *bm*, very narrowly at base of *dm* and *cup* without microtrichia. Hind margin of wing with black or brown setulae. Venation as in Fig. 278. Haltere uniformly yellow-brown basally, knob brown, with areas of sensillae at base.

Legs: Fore and mid legs pale yellow. Hind leg darker with brown base and brown dorsal surface of hind femur, and yellow-white subapical area at hind tibia. Legs mainly with black or brown setulae, only fore and mid tibiae and fore femur additionally with pale yellow setulae. Setae on fore and mid coxae whitish yellow, and on hind coxa black. Fore coxa without distinct setae, but with strong white setulae distally. Mid coxa with 1 white seta. Hind coxa without lateral black setulae, but with strong black setulae distally on anterior surface. Hind trochanter without teeth or dense setulae. Mid femur with a row of regularly-arranged black setulae posteriorly on basal half and additionally, a few longer setulae on ventral surface. Mid tibia with short erect black setulae ventrally (Fig. 277). Hind femur with few longer black setulae ventrally. Hind tibia with 2 short black spines on anterior surface. Claws dark brown basally, distally black. Pulvilli pale yellow. Empodia short, brown.

Abdomen: Mainly orange-brown, tergites 2–4 with conspicuous dark brown posterior margin and less distinct brown medial fascia, tergites 5–6 and epandrium slightly darker brown medially (Fig. 274). Tergites with semi-adpressed black setulae. Tergite 1 with long black setulae laterally, tergite 2 on anterior margin with 6 black lateral setae on either side. Terminalia as illustrated in Figs 279–284. Cercus triangular, conspicuously broadened laterally (Fig. 281). Dorsal margin straight. Cercus with a conspicuous lappet ventrally, clothed in black setae (Figs 281, 282). Surstylus without teeth, but with unique outline, and black setae distally. No setulae on inner surface. Phallus sheath as illustrated in Fig. 283. Some distinct black setulae distally.

Female. Unknown.

Holotype: ♂ MADAGASCAR: (1) "Madagascar: Prov. Antananarivo. 46 km NE / of Ankazobe: Anbohitantely 18°11.88'S / 47°16.89'E, 7.-22.xII.2004, 700m, malaise trap in / sclerophyl forest MG 27-23"; (2) "CASENT 807G539"; (3) "Holotypus / *Stylogaster* / *spinicercus* ♂ / des. Stuke, 2011" (CAS). Left hind leg and several setae damaged. Abdomen dissected, macerated and deposited in glycerine in a microvial pinned beneath specimen, holotype otherwise in reasonable condition.

Distribution: Endemic to Madagascar.

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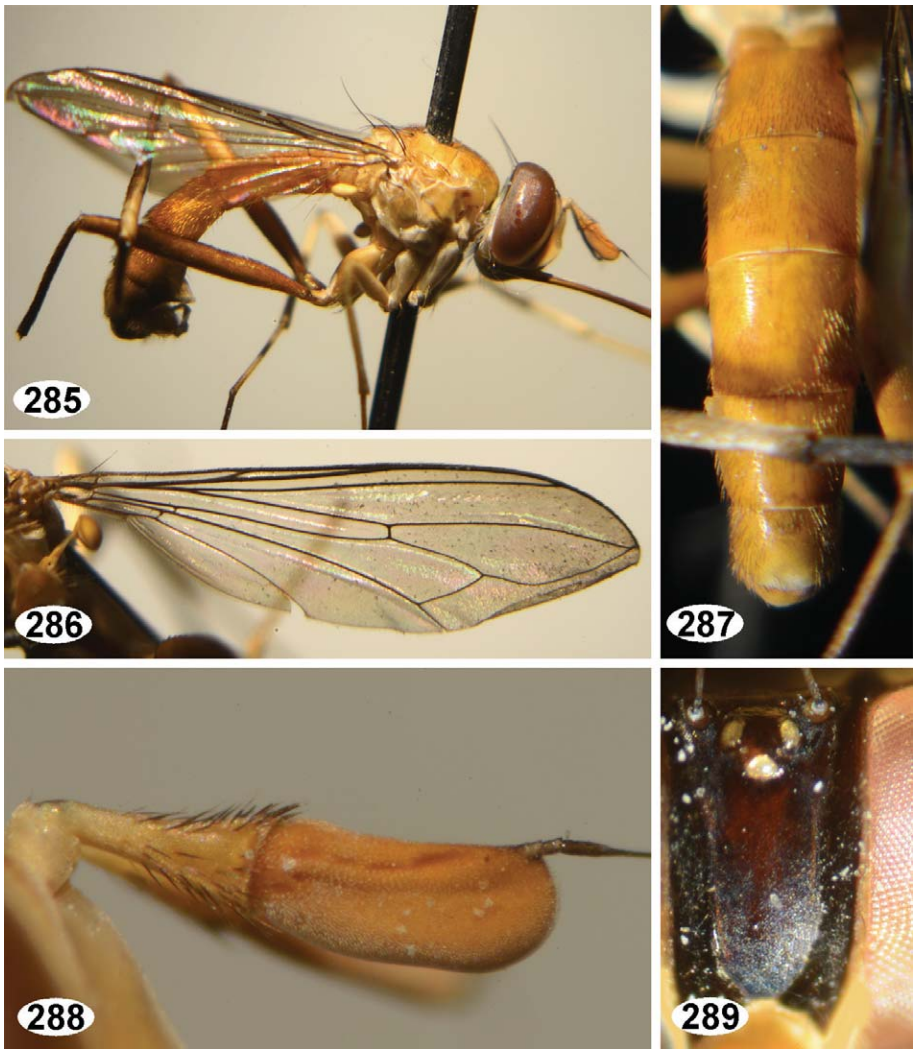
Bionomics: Sampled in sclerophyl forest at low elevation (700 m).

Stylogaster stuckenbergi sp. n.

Figs 285–296

Etymology: The species is named in honour of the late Brian Roy Stuckenberg (1930–2009), who published one of the most important papers dealing with Afrotropical *Stylogaster* and loaned specimens cited in this paper.

Diagnosis: *Stylogaster stuckenbergi* sp. n. can be recognised by the orange-brown abdomen and thorax (Fig. 287), and by the entirely black frons with a broad ocellar triangle



Figs 285–289. *Stylogaster stuckenbergi* sp. n. (♂): (285) habitus, lateral view (holotype); (286) wing (♂ paratype); (287) abdomen, dorsal view (holotype); (288) antenna, lateral view (holotype); (289) frons (holotype). Not to scale.

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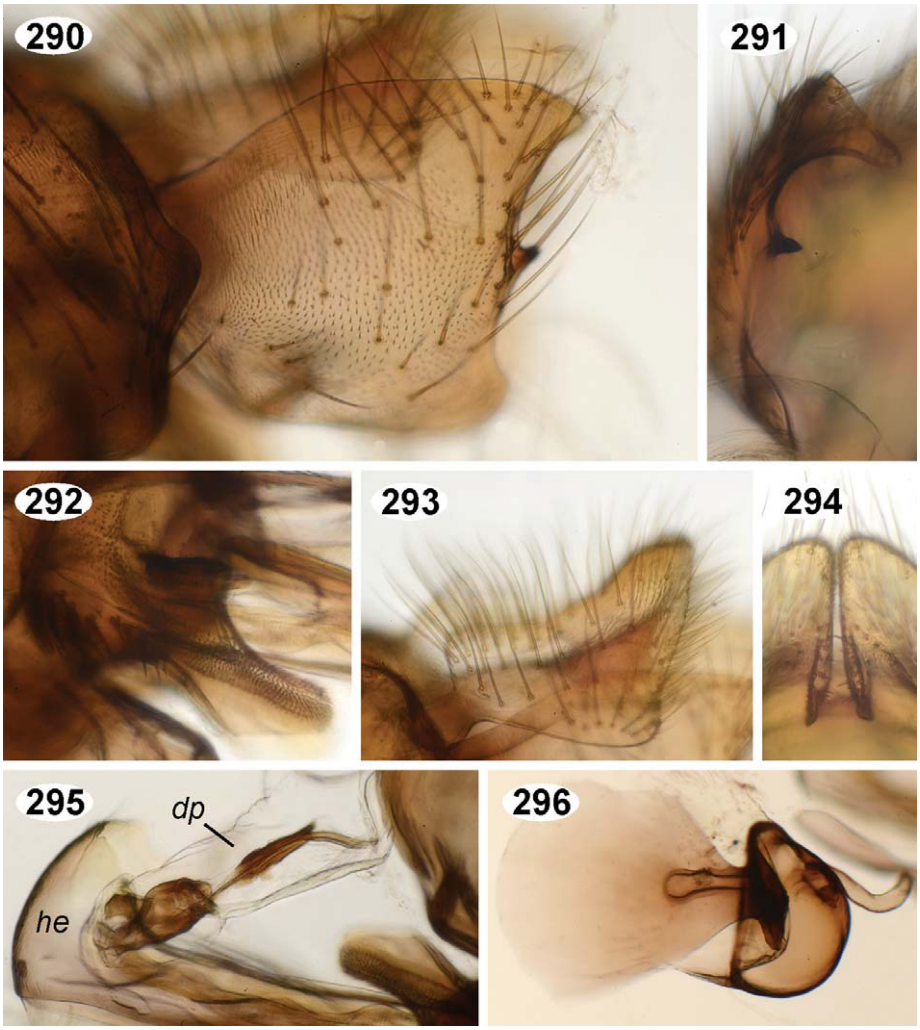
(Fig. 289). Concerning females sharing these characters, there is at least one undescribed species similar to *S. stuckenbergi.* The male terminalia (Figs 290–296) should be taken into account when identifying the species.

Description (based on holotype):

Male.

Overall length: *ca* 8.5 mm.

Head: 1.8 mm high. Eye dark brown, with a few scattered, inconspicuous ommatrichia. Facets on inner side slightly enlarged. Ocelli yellow-brown. Ocellar tubercle blackish



Figs 290–296. Terminalia (♂) of *Stylogaster stuckenbergi* sp. n. (paratype): (290) surstylus, lateral view; (291) same, dorsal view; (292) phallus sheath of hypandrium, lateral view; (293) cercus, lateral view; (294) teeth at ventral side of cerci, dorsal view; (295) hemispherical extension of hypandrium; (296) sperm pump and ejaculatory apodeme. Abbreviations: *he* – hemispherical extension; *dp* – distiphallus. Not to scale.

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brown, with 1 pair of inconspicuous ocellar setae. Ocellar triangle occupies virtually entire frons, reaching as far as antennae (Fig. 289). Ocellar triangle black. Frons black lateral to ocellar triangle, with 4 fronto-orbital setae. Scapus yellow-brown, pedicellus yellow-brown basally, pale brown distally, basal flagellomere pale brown. Arista dark brown, black at apex, 3 segments evident. Arista situated dorsally at apex of basal flagellomere (Fig. 288). Scapus dorsally with few pale brown setulae. Pedicellus with black setulae. Shape of antenna as illustrated in Fig. 288. One distinct golden vertical seta. Face pale yellow with silver pruinosity. Occiput black to brown, distinctly silver pruinose; dorsally with row of regularly-arranged small white setulae, ventrally with several longer white setulae. Some long white setulae on mouth opening. Proboscis uniformly pale brown. Labrum *ca* 3.4 mm, labellum approximately same length.

Thorax: Yellow-brown. Setae black and golden. Two golden notopleural setae (1 on right side of mesoscutum black), 1 supra-alar seta damaged, 2 black postalar setae, 1 black praescutellar dorsocentral seta, 1 black apical scutellar seta, 1 black seta on anepimeron and 1 golden seta above fore coxa on propleuron. Golden, semi-adpressed setulae on mesoscutum.

Wing: Length 6.4 mm. Generally clothed in microtrichia, but base of *c*, base of r_{2+3}, most of *br*, *bm*, base of *dm*, *cup* and base of anal lobe virtually without microtrichia. Hind margin of wing with black setulae. Venation as in Fig. 286. Haltere uniformly yellow-brown, with areas of sensillae at base.

Legs: Fore and mid legs whitish yellow, hind leg brown with subapical white area on hind tibia and conspicuous black hind tarsi. Fore and mid legs with white setae and setulae, hind leg with black, golden and white setae and setulae. Fore and mid coxae without distinct setae, but with strong golden setulae distally. Hind coxa with strong golden setulae distally on anterior surface, and smaller golden setulae laterally. Hind trochanter without teeth or conspicuous setulae. Mid femur with a row of regularly-arranged, golden setulae posteriorly in distal half. Hind tibia with single short black spines on anterior surface. Claws brown only narrowly basally, distally black. Pulvilli brown. Empodia short, brown.

Abdomen: Uniformly orange-brown (Fig. 287). Tergites with semi-adpressed black and golden setulae. Tergite 1 with long golden setulae laterally, tergite 2 on anterior margin with 3 black and 3 golden lateral setae on either side. Abdomen of holotype not dissected, but appears to match terminalia of a paratype. Terminalia as illustrated in Figs 290–296. Cercus triangular with a distinct 90° angle distally (Fig. 293). Dorsal margin concave. Cercus with conspicuous lappet ventrally (Fig. 294). No conspicuous teeth ventrally. No black setae. Surstylus with 1 medial black tooth at concave distal margin (Fig. 291). Inner surface with barely visible keel ventrally, and few strong setulae. Phallus sheath as illustrated in Fig. 292. Strong black basal setulae conspicuous.

Female. Unknown.

Holotype: ♂ MADAGASCAR: (1) "Madagascar, Fianarantsoa Prov., / 12 km W Ranomafana Natl Pk / entrance. radio tower, malaise in / montane tropical forest. 20.III- / 3.IV.03, R H 'Hala, M E Irwin, 1215m / 21°15.05'S. 47°24.43'E. MG 9B-56"; (2) "Holotypus / *Stylogaster* / *stuckenbergi* ♂ / des. Stuke, 2011" (CAS). Holotype complete, in good condition.

Paratypes: MADAGASCAR: *Fianarantsoa*: 1♂ same data as holotype, except 30.iv–7.v.2002 [*sic*!] (CAS); 2♂ same, except 5–13.v.2002 [*sic*!] (CAS & J-HS); 1♂ Belle Vue, 1.2 km S Ranomafana, Parc National Ranomafana, entrance, rainforest, 21°15.99'S 47°25.21'E, 1095 m, 26.ii–4.iii.2001, M. Irwin & R. Harin'Hala, Malaise trap (J-HS); 2♂ same, except 26–31.iii.2002 (CAS).

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Distribution: Endemic to Madagascar.

Bionomics: Found in primary rainforest at moderately high elevation (1095–1215 m).

Stylogaster varifrons Malloch, 1930

Stylogaster varifrons Malloch, 1930: 465 (Type locality: Zimbabwe: "Umtali, S. Rhodesia").

Literature: Camras (1962*a*, *b*), Kröber (1939), Malloch (1930), Smith (1967), Smith & Cunningham-van Someren (1985).

Material examined: KENYA: *Coast*: 1♀ Arabuko-Sokoke Forest, 3°25.21'S 39°53.81'E, 7–14.vii.2000, R. Copeland, Malaise trap; 1♂ same, except 5–12.viii.2000 (NMKE & J-HS). MALAWI: 3♂ Mulanje Mountain, Likabula River valley, SE1535Dc, 1000 m, 28–30.xi.1980, J.G.H. Londt & B.R. Stuckenberg, riverine *Brachystegia* woodland (NMSA). ZAMBIA: 2♂ Kasanka National Game Reserve, Lake Wasa area, Dambo, 12°30'S 30°15'E, 16–22.xii.1989, P.E. Reavell (NMSA); 1♂ Kasempa env. forest meadow, 13°27.62'E:25°50.35'E, 16–18.xi.2006, Kubik; 1♂ 50 km W Chingola, 1–2.i.2003, Halada (MB & J-HS).

Distribution: Widely distributed in tropical Africa: Kenya, Malawi, Uganda, Zambia and Zimbabwe. Additional published records from the Democratic Republic of the Congo require confirmation.

Stylogaster westwoodi Smith, 1967

Figs 2–10

Stylogaster westwoodi Smith, 1967: 64–66 (Type locality: Tanzania: "Tanganyika: Amani").

Literature: Hinton (1981), Smith (1967), Smith & Cunningham-van Someren (1985).

Material examined: KENYA: *Eastern Province*: 2♂ Kibwesi forest, 2°27.90'S 37°54.91'E, 13–20.xi.1999, R. Copeland, Malaise trap; 1♂ 1♀ same, except 27.xi–4.xii.1999. *Western Province*: 1♂, Kakamega Forest, 0°14.13'S 34°51.87'E, 9–16.iv.2000, R. Copeland, Malaise trap; 1♀ same, except 19–26.vi.2000; 1♂ "Wika", 4.ix.1987, R. Copeland; 1♀ Magunga, 18.ix.1987, R. Copeland. *Coast*: 2♀ Muhaka Forest, 4°19.47'S 39°31.45'E, 1–6.ix.1999, R. Copeland, Malaise trap; 1♀ same, except 6–13.i.2000; 1♀ Arabuko-Sokoke forest, 3°25.21'S 39°53.81'E, 3–10.iv.1999, R. Copeland, Malaise trap; 1♀ same, except 26.v–2.vi.2000 (all NMKE & J-HS); 1♂ Nairobi, Karura forest, 1°14'S 36°50'E, 5000 ft, 15.i.1972, C.F. Huggins (BMNH). MALAWI: 1♂ Ntchisi Forest Reserve, SE1334Ac, 1500 m, 3–4.xii.1980, J.G.H. Londt & B.R. Stuckenberg, montane forest woodland (NMSA); 1♀ Kasungu National Park, Lifupa Camp, SE1333Aa, 9–10.xii.1980, 1000 m, J.G.H. Londt & B.R. Stuckenberg (NMSA). SOUTH AFRICA: *Limpopo*: 1♂ Kruger National Park, Pafuri, 22°21'S 31°17'E, 1–13.ii.1980, L. Braack, Malaise trap (NMSA); 1♂ Lekqalameetse Reserve, 24°12'S 30°20'E, 25–31.iii.2001, F. Koch (ZMHB). TANZANIA: 1♀ Mlingano, iv.1952, J. Shipps (BMNH).

Distribution: Widely distributed in the Afrotropics: the Democratic Republic of the Congo, Kenya, Malawi, Nigeria, South Africa, Tanzania and Zimbabwe.

DISCUSSION

Thirty-four valid species of Afrotropical *Stylogaster* are now known, representing 30% of the world fauna of this genus. Twenty-three species (68%) are apparently restricted to Madagascar, and none are currently known to occur both on Madagascar and in the continental Afrotropical Region. Whether the apparently high diversity on Madagascar is due to its long isolation and *in situ* speciation, or the result of disproportionately intensive sampling efforts on Madagascar in the past few years, remains an open question. Only three Afrotropical species appear to be widely distributed: *S. leonum* (Cameroon, Democratic Republic of the Congo, Ghana, Nigeria, Sierra Leone and Uganda), *S. nitens* (Angola, Democratic Republic of the Congo, Ghana, South Africa and Uganda) and *S. varifrons* (Democratic Republic of the Congo, Kenya, Malawi, Uganda and Zimbabwe). Seventeen Afrotropical species are known only from the unique holotype or from the

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holotype and one paratype. These figures indicate that species richness in the genus is underestimated and that our understanding of the diversity of the group is still in its infancy. Undoubtedly, numerous other species await discovery.

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Appendix. Annotated checklist of Afrotropical species of *Stylogaster* Macquart, 1835 (Diptera: Conopidae). Abbreviations: HT – holotype; LT – lectotype; ST – syntypes. See Material and Methods for list of institutional codens.

Genus *Stylogaster* Macquart, 1835

Stylogaster Macquart, 1835: 38. Type species: *Stylogaster stylata* Fabricius, 1805, by monotypy.
Stylomyia Westwood, 1851: 268. Type species: *Stylogaster leonum* Westwood, 1851, by subsequent designation of Coquillett (1910: 610).
Ptychoproctus Bigot, 1859: 308. Type species: *Stylogaster complexa* Bigot, 1859, by monotypy.

acanthocercus Stuke, **sp. n.** Type locality: "Madagascar: Fianarantsoa Prov., Belle Vue, 1.2 km S Ranomafana National Park entrance" (HT ♂ CAS). Afrotropical: Madagascar.

amplicercus Stuke, **sp. n.** Type locality: "Madagascar: Toamasina Province, 7 km SE of Andasibe National Park" (HT ♂ CAS). Afrotropical: Madagascar.

camrasi Stuckenberg, 1963: 269. Type locality: "Madagascar: between Moramanga and Anosibe" (HT ♂ MNHN). Afrotropical: Madagascar.

clementsi Stuke, **sp. n.** Type locality: "Madagascar: Fianarantsoa Prov., 12 km W Ranomafana National Park" (HT ♂ CAS). Afrotropical: Madagascar.

complexa Bigot, 1859: 309 (*Ptychoproctus*). Type locality: "[South Africa]: Natal. Port" (HT ♂ BMNH). Afrotropical: South Africa.

copelandi Stuke, **sp. n.** Type locality: "Kenya: Western Prov., Kakamega Forest" (HT ♂ NMKE). Afrotropical: Kenya.

fanjae Stuke, **sp. n.** Type locality: "Madagascar: Province Fianarantsoa, Parc National Ranomafana" (HT ♂ CAS). Afrotropical: Madagascar.

frontalis Kröber, 1914: 344. Type locality: "[Democratic Republic of Congo]: Congo Belge: P.N.A., Masif Ruwenzori, Kalonge" (LT here designated ♂ MRAC). Afrotropical: Democratic Republic of the Congo. [Only records of males published after the revision of Smith (1967) are accepted.]

hauseri Stuke, **sp. n.** Type locality: "Madagascar: Fianarantsoa Prov, 17 km W Ranomafana, Vohiparara, Ranomafana National Park" (HT ♂ CAS). Afrotropical: Madagascar.

hirsutifemora Stuke, **sp. n.** Type locality: "Madagascar: Prov. Antananarivbo, 46 km NE of Ankazobe: Ambohitantely" (HT ♂ CAS). Afrotropical: Madagascar.

irwini Stuke, **sp. n.** Type locality: "Madagascar: Toliara Prov., Fiherenana" (HT ♂ CAS). Afrotropical: Madagascar.

kakamegensis Stuke, **sp. n.** Type locality: "Kenya: Kakamega Forest" (HT ♂ BMNH). Afrotropical: Kenya.

kenyensis Stuke, **sp. n.** Type locality: "Kenya: Western Prov., Kakamega Forest" (HT ♂ NMKE). Afrotropical: Kenya.

kirkspriggsi Stuke, **sp. n.** Type locality: "South Africa: Cape Province, Cold spring, Grahamstown" (HT ♂ AMGS). Afrotropical: South Africa.

kroeberi Stuke, **sp. n.** Type locality: "Madagascar: Toliana Prov., Fiheren" (HT ♂ CAS). Afrotropical: Madagascar.

latifrons Stuke, **sp. n.** Type locality: "Madagascar: Province Fianarantsoa, Parc National Ranomafana" (HT ♂ CAS). Afrotropical: Madagascar.

leonum Westwood, 1851: 269 (*Stylomyia*). Type locality: "Sierra Leona, Africae" (HT ♂ BMNH). Afrotropical: Cameroon, Democratic Republic of the the Congo, Ghana, Nigeria, Sierra Leone and Uganda. [Only records published after the revision of Smith (1967) are accepted.]
subapicalis Camras, 1955: 122. Type locality: "Cameroon: Lolodorf" (HT ♀ FMNH).

malgachensis Camras, 1962*b*: 185. Type locality: "[Madagascar]: Ankarafantsika Forest, Tsaramandroso" (HT ♀ MNHN). Afrotropical: Madagascar.

nilssoni Smith, 1984: 233. Type locality: "Madagascar: Ankazobe, Ambohitantely Forest" (HT ♀ BMNH). Afrotropical: Madagascar.

nitens Brunetti, 1925: 111. Type locality: "[Ghana]: Obuasi Ashanti" (ST 2♂ BMNH). Afrotropical: Angola, Democratic Republic of the the Congo, Ghana, South Africa and Uganda. [Egg records from hosts (♂ and ♀) without examination of male terminalia, remain unverified as more than one species may be involved.]
nitidula Kröber, 1936: 262. Type locality: "[Democratic Republic of Congo]: Elisabethville" (HT ♀ MRAC).
parva Camras, 1955: 121. Type locality: "Uganda: Kwanda" (HT ♂ BMNH).

obscurinotum Kröber, 1936: 260. Type locality: "[Democratic Republic of Congo]: Bambesa" (HT ♀ MRAC). Afrotropical: Democratic Republic of the Congo, Burundi and Rwanda.

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parkeri Stuke, **sp. n.** Type locality: "Madagascar: Fianarantsoa Prov., 12 km W Ranomafana National Park entrance" (HT ♂ CAS). Afrotropical: Madagascar.
pauliana Camras, 1962*b*: 186. Type locality: "[Madagascar]: Analavelona Mt." (HT ♀ MNHN). Afrotropical: Madagascar.
pseudofanjae Stuke, **sp. n.** Type locality: "Madagascar: Province Fianarantsoa, Parc National Ranomafana, radio tower" (HT ♂ CAS). Afrotropical: Madagascar.
ranomafanensis Stuke, **sp. n.** Type locality: "Madagascar: Fianarantsoa Prov., 17 km W Ranomafana Vohiparara, Ranomafana National Park" (HT ♂ CAS). Afrotropical: Madagascar.
rinhaii Stuke, **sp. n.** Type locality: "Madagascar, Fianarantsoa Prov., 12 km W Ranomafana National Park entrance" (HT ♂ CAS). Afrotropical: Madagascar.
schachti Stuke, **sp. n.** Type locality: "Madagascar: Province Fianarantsoa, Parc National, Ranomafana" (HT ♂ CAS). Afrotropical: Madagascar.
seguyi Camras, 1962*b*: 184. Type locality: "[Madagascar]: Mtge. d'Ambre" (HT ♂ NHMB). Afrotropical: Madagascar.
seyrigi Séguy, 1932: 161. Type locality: "Madagascar: Rogez" (LT ♀ MNHN). Afrotropical: Madagascar.
smithi Stuke, **sp. n.** Type locality: "Madagascar: Province Fianarantsoa, Parc National, Ranomafana" (HT ♂ CAS). Afrotropical: Madagascar.
spinicercus Stuke, **sp. n.** Type locality: "Madagascar: Prov. Antananarivo. 46 km NE of Ankazobe: Anbohitantely" (HT ♂ CAS). Afrotropical: Madagascar.
stuckenbergi Stuke, **sp. n.** Type locality: "Madagascar, Fianarantsoa Prov., 12 km W Ranomafana National Park entrance" (HT ♂ CAS). Afrotropical: Madagascar.
varifrons Malloch, 1930: 465. Type locality: "[Zimbabwe]: Umtali, S. Rhodesia" (HT ♂ BMNH). Afrotropical: Kenya, Malawi, Uganda, Zambia and Zimbabwe. [Additional published records from the Democratic Republic of Congo require confirmation.]
westwoodi Smith, 1967: 64. Type locality: "[Tanzania]: Tanganyika: Amani" (HT ♀ BMNH). Afrotropical: Democratic Republic of the Congo, Kenya, Malawi, Nigeria, South Africa, Tanzania, Zambia and Zimbabwe.

Nomina dubia

bigoti Smith, 1967: 66. Type locality: "S. Nigeria: Oshogbo" (HT ♀ BMNH). Afrotropical: Nigeria.
cohici Séguy, 1946: 99. Type locality: "Côte d'Ivoire: réserve du Banco" (HT ♀ MNHN). Afrotropical: Ivory Coast.

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